# THE JOURNAL

OF THE

## American Medical Association

*Published Under the Auspices of the Board of Trustees*

VOL. 166, NO. 13 — CHICAGO, ILLINOIS — MARCH 29, 1958

COPYRIGHT, 1958, BY AMERICAN MEDICAL ASSOCIATION

# MANAGEMENT OF THE SERIOUSLY ILL ASTHMATIC

**Giles A. Koelsche, M.D., Haddon M. Carryer, M.D., Gustavus A. Peters, M.D.**
**and**
**Lowell L. Henderson, M.D., Rochester, Minn.**

DESPITE the last two decades' accumulation of knowledge concerning the cause of asthma and the many preparations—including steroids and ACTH—which have been advocated for its treatment, the care of the patient acutely beset with this disease is yet, as always, a challenge. This discussion is directed toward those situations in which the asthma has become so severe, disabling, and refractory to therapeutic measures practicable in the home that hospitalization is desirable, if not imperative.

With these cases our goals today as in the past are to provide symptomatic relief and to establish the cause and the complications, if any, and to remove them. If the asthma is severe, investigation of causative factors is postponed until the condition has been brought under control. As an exception, however, the possibility that some drug allergy is the cause should be considered early. It is not always possible to identify the specific etiological factor; but if it can be found and eliminated, as in patients with extrinsic asthma, the condition can in effect be cured. Actually, if only his symptoms can be controlled the acutely ill asthmatic likely will be very happy and well satisfied. The scientifically motivated physician, however, is always searching for more than this.

*An essential objective in the treatment of seriously ill asthmatic patients is control of the environment. This usually means hospitalization in a private room especially prepared to eliminate all usual irritants. Four further objectives are rest, control of cough, liquefaction of sputum, and control of anoxemia. A sixth objective must be considered in asthmatic patients of long standing, namely the management of complications such as emphysema, bronchostenosis, respiratory infections, drug allergies, and intercurrent surgical conditions. Steroids will usually control the symptoms of asthma promptly, but their prolonged use is dangerous. Medication affords only symptomatic relief in asthma and cannot overcome the bad effects of poor environmental control.*

### Therapeutic Objectives and Methods

In the management of these patients, we conceive five major therapeutic objectives which one should strive to attain as soon as possible after their hospitalization.

From the Section on Medicine, Mayo Clinic and Mayo Foundation. The Mayo Foundation is a part of the Graduate School of the University of Minnesota.

*Environmental Control.*—Environmental control is approached by placing the patient in a specially prepared private room. Ideally this should be devoid of dust, drafts, drapes, flowers, noise, strong odors, smoke, rugs, and relatives. Dustproof covers should be placed on the mattress and pillows before the patient arrives. A window filter to exclude pollen and dust is essential if pollen is in season or if the hospital is in a dusty location. An asthmatic patient and the care he requires will disrupt the rest and quietude of other patients if he is put in a ward; hence a private room is essential.

If the asthma abates dramatically in the first 24 to 48 hours, extrinsic factors probably have been important in causing it. Conversely, if the asthma fails to improve rapidly under such circumstances it is more likely that intrinsic factors chiefly are responsible for it.

When the acute phase of the asthma has been controlled, then etiological study—including special consideration of possible exposure to allergens consequent to seasonal, dietary, or environmental factors incident to occupation, residence, or travel, as well as the performance and appraisal of skin sensitization tests—may be undertaken. Careful inquiry regarding medicaments which the patient has used and possible allergic reactions to any of these is essential.

"Will a change of climate help?" is a question asked often by the patient or a well-meaning relative. It is not an easy one to answer categorically, since we know of no climate where asthma does not occur. Furthermore, the emotional stress incident to leaving one's established occupation and friends and starting all over again in another part of the country may actually aggravate asthma. If the patient's condition is always worse in cold, damp weather and relatively clear in the summer, the physician might suggest that he try spending several months of the winter period where the weather at that season is warm and dry. Only thereafter, if much improvement is noted, should the patient consider a more permanent change of climate.

*Rest.*—Relief from the asthmatic paroxysm cannot be expected until the patient is both mentally and physically at ease; thus rest becomes a second major objective of treatment. Anxiety is a prime factor in aggravating the severity of status asthmaticus. Through loss of sleep, mounting fears, and the tiring effect of repeated episodes of breathlessness, a self-perpetuating state of utter physical and emotional exhaustion develops.

The reassuring approach and confident attitude of the physician are effective remedies for this condition. Let nothing ever be said in the presence of the patient by physician or nurse which could lead the patient to believe that his condition is out of the ordinary in any way or that the outcome will be anything but favorable.

The intelligent use of sedatives also is important in securing rest for the patient, but one must bear in mind that asthmatics as a group tolerate them poorly. Those which have a depressant action on the respiratory center should not be used. We prefer to rely on such preparations as chloral hydrate, paraldehyde, and phenobarbital. Because of their sedative effect certain antihistamines may be useful in such cases. Chlorpromazine and promazine (Sparine) have been helpful in tranquilizing these patients. In our opinion, drugs such as morphine, codeine, meperidine (Demerol) hydrochloride, and dihydromorphinone (Dilaudid) hydrochloride are to be avoided strictly, some because of their depressant action on the respiratory center and all because of their habit-forming properties.

When the acute asthmatic symptoms are controlled, for the long-term purpose of enabling the patient to avoid exacerbation of his asthma by leading a tranquil life, psychiatric consultation may be considered in selected cases. We believe that very few asthmatic patients need complete psychiatric evaluation, but there is a small group with emotional problems who may derive some help from this approach.

*Control of Cough.*—Coughing aggravates bronchitis and produces bronchospasm and thus increases dyspnea and wheezing; control of it is an important third objective. Many patients have the habit of overcoughing, which can itself be exhausting and debilitating.

The physician should keep encouraging the patient to try earnestly to suppress his desire to cough. The simple device of having him suck on some hard candy may help much in this regard. Also, it is important for him to avoid the inhalation of all types of respiratory irritants, since these provoke coughing. As examples may be mentioned cold air, irritating fumes, strong odors, and smoke from tobacco and other sources, including that from burning stramonium leaves. In our opinion, no asthmatic patient should smoke. Finally, inhalations of steam seem to mitigate bronchial irritation for some patients and thus allay the desire to cough.

*Liquefaction of Sputum.*—Many persons who have died in status asthmaticus have been found to have the terminal bronchi plugged with casts of mucus which they have been unable to raise. Liquefaction of sputum thus is another major objective.

Hydration is one approach to this problem. The sputum in most cases of status asthmaticus is thick and tenacious, and is raised with difficulty because the patients are dehydrated. Adequate intake of fluid combats this effectively in many instances.

The intravenous administration of 2 to 3 liters of 5% glucose may be warranted during the first 24 hours of hospitalization, especially if the weather is warm or if the patient is not taking fluids well by

mouth. One must be careful not to give too much fluid parenterally to individuals whose asthma is complicated by borderline cardiac decompensation or early cor pulmonale with severe emphysema. When the patient becomes able to drink 10 to 14 glasses of liquid daily, the intravenous administration of fluids as a hydrating measure may be discontinued.

Expectorants should be accounted an adjuvant to hydration, since their thinning effect on sputum is negligible until the patient's body fluids are restored. Effective preparations of this group are sodium iodide and potassium iodide; we usually employ a total daily dosage of 0.65 to 1 Gm. Intolerance commonly is manifested by painful, swollen salivary glands 24 to 48 hours after the medication is started, or as an iododerma which may become apparent after four to seven days of administration. The development of periarteritis nodosa following the use of iodides has been reported.[1] We have encountered one serious reaction, possibly partly of this type, with fatal termination. Sensitivity to penicillin likely was the major etiological factor, although a reaction to the iodide may have contributed also. The use of arsenic for these patients is to be avoided because of the serious cumulative toxic effects of this substance. For patients clinically sensitive to iodides, ammonium chloride may be used as a substitutive expectorant, although its effectiveness in this regard is less.

The use of highly purified proteolytic enzymes and certain detergent solutions by aerosolization has been advocated for diseases like asthma in which thick, viscid sputum is a problem, but our experience with these preparations is that they are irritating and not helpful.

*Control of Anoxemia.*—In status asthmaticus, anoxemia is the consequence of excessive secretion of mucus by the bronchial mucosa, edematous swelling of this mucosa, and bronchoconstriction. Control of anoxemia is the fifth objective, and the use of bronchodilators and the inhalation of gases help to achieve it.

Of the bronchodilators, aminophylline (a xanthine derivative) is useful, either intravenously in a dosage of 0.25 Gm. or rectally as a suppository or retention enema in a dosage of 0.5 Gm. Theophylline-methylglucamine (Glucophylline) rectal suppositories are equally effective and rarely cause rectal irritation. When the acute phase of the asthma has passed aminophylline may be used orally, often in combination with an ephedrine derivative and phenobarbital; but its therapeutic efficacy by this route of administration is less.

Ephedrine or related substances like phenylpropanolamine (Propadrine) hydrochloride or methoxyphenamine (Orthoxine) hydrochloride are used commonly with aminophylline and a sedative. Ephedrine is supposed to slow the rate of enzymatic destruction of endogenous epinephrine. It may cause cerebral excitation or increase in the symptoms of prostatic obstruction; hence it must be used with some care in older men. Methoxyphenamine reputedly has less vasospastic action than ephedrine and thus may be used with greater theoretic safety in asthmatic patients with severe hypertension.

In status asthmaticus, epinephrine and its derivatives usually have lost their effectiveness in relieving bronchospasm, at least temporarily. If they have not, or when the status is controlled, they should be tried. Epinephrine may be taken by inhalation, most frequently, of a 1% solution. It should be used with some caution in the aged. Patients who are to take it by injection should use a 1:1,000 aqueous solution and should be instructed in self-administration. This helps to obviate anxiety which they may feel during acute attacks while waiting for the physician to come.

Isoproterenol, which is isopropyl norepinephrine, is supposed to cause fewer cardiovascular side-effects. It is to be used only by inhalation, either as an aqueous solution or as a powder (Norisodrine).

The inhalation of oxygen either alone or in combination with helium is another effective way to combat anoxemia. The percentage of oxygen used in the mixture may range anywhere from 20 to 100 and is determined by what seems to afford the patient the most relief. If helium is part of the mixture employed, it is well to advise the patient that his voice will be high pitched during the period of inhalation.

There are three effective ways by which oxygen can be administered. The first is by means of a nasal catheter. It is the simplest method and affords an effective concentration of the gas, though not so high as the other ways. The second is by the oxygen tent. This makes possible a concentration which approaches 50% and has the added advantage of providing the patient with an air-conditioned, allergen-free atmosphere. The third method of administration is the BLB mask. This is the only efficient and economical way to administer mixtures of oxygen and helium, and the device also makes possible the administration of 100% oxygen.

The inhalations of oxygen by patients who have severe asthma without significant degrees of emphysema may be continued for 24 to 48 hours or may be used intermittently, depending on how the patient is progressing. Positive-pressure devices such as the Bennett valve or mine safety valve have not proved helpful at the Mayo Clinic in the treatment of status asthmaticus.

## Complications

In the over-all and long-term handling of bronchial asthma, special consideration is required for a number of conditions which may be associated

with it or develop during its course. The control of these complications as it relates to the management of severe asthma might be regarded as a sixth objective.

*Emphysema.*—A complication encountered not infrequently, emphysema poses hazards in one of three ways. The first is that the overuse of oxygen may lead to an alarming train of developments. In severe emphysema, there is difficulty in ridding the venous blood of its accumulated carbon dioxide. Hence there is some increase in the carbon dioxide content of the circulating blood, and the respiratory center becomes less sensitive to it. Oxygen want rather than carbon dioxide accumulation becomes the regulating factor of respiration. The administration of high concentrations of oxygen by inhalation under such circumstances may suppress the respiration and lead to hypercapnea, convulsive seizures, and transient coma. This danger is less if the oxygen is given by means of a nasal catheter.

The second hazard is the spontaneous rupture of an emphysematous bleb. Should this be situated on the visceral pleura, spontaneous pneumothorax will result. If the rupture occurs on the mediastinal pleura, the patient will develop mediastinal and subcutaneous emphysema.

The third hazard is the development of acute cor pulmonale with congestive failure and sometimes rather sudden death. The prophylactic digitalization of patients with this type of problem has much to be said in its favor.

Therapeutic measures to be considered for emphysema include breathing exercises, the inhalation of bronchodilating drugs, intermittent positive-pressure breathing, pneumoperitoneum, and the use of an abdominal belt. Control of cough and the associated bronchitis is most important. Our results from the use of radioiodine and those reported by others [2] have not been encouraging.

*Bronchostenosis.*—Another complication, bronchostenosis, was found in 327 instances in a recent series [3] of 1,034 asthmatic patients who underwent bronchoscopy. Bronchostenosis produces the sputum retention syndrome, which is characterized by fever, cough, hemoptysis, and usually exacerbation of the asthma. Often the condition is diagnosed as pneumonia; but physical examination discloses suppression of the breath sounds distal to the stenotic bronchus, and 30% of the 327 cases afforded roentgenographic evidence of atelectasis in the same area. Bronchoscopic examination and dilatation of the stenotic bronchus was followed by marked improvement of the asthma in many instances.

*Respiratory Infections.*—Acute infections in any part of the respiratory system, such as pneumonitis, tracheobronchitis, or sinusitis, complicate the management of severe asthma. The prompt, adequate use of antibiotics will lessen the hazard of these. Surgical operations on the sinuses as indicated should be carried out when the acute infection has subsided or if the suppurative disease of the sinuses is chronic.

*Surgical Conditions.*—Special precautions must be taken for the asthmatic patient in whom indications for surgical measures appear. Generally speaking, elective operations should be deferred until the asthma is controlled; but conditions such as malignancy, acute cholecystitis with stones, complicated duodenal ulcer, or a large hernia may render early treatment imperative, despite the potentially increased risk. The preoperative use of steroids will help to get intractable asthma under control before operation; and certainly if the patient has been taking steroids for some time already, they should be used to enable him to stand the extra stress of an operation.

In selecting anesthetics one must remember that asthmatic patients, more often than most, react unexpectedly and badly to those ordinarily used—for example, to cocaine given topically for bronchoscopy or to thiopental sodium given intravenously. Ether is one that may be used safely, and it may even help to control the asthma.

Finally, the frequency of postoperative complications such as atelectasis may be lessened by repeated inhalations, during five minutes every hour for a few days postoperatively, of a mixture containing 95% oxygen and 5% carbon dioxide.

*Drug Allergy.*—The management of asthma may be complicated greatly by drug allergy, unless this condition is suspected and detected early. The clinician must be certain that the patient is taking no medicament to which he might be sensitive, such as aspirin and its derivatives or certain antibiotics.

*Other Complications.*—A few rarer complicating conditions may be mentioned. Laryngeal lesions may simulate, may be coexistent with, and if unrecognized certainly will hinder the effective management of severe asthma. A laryngeal tumor or paralyzed vocal cords secondary possibly to malignant changes in the thyroid should be excluded early. Additional infrequent complications of status asthmaticus include rupture of the esophagus,[4] spontaneous fracture of a rib, and tussive syncope.

## Use of Steroids and Corticotropin

A discussion of the management of the seriously ill asthmatic would not be complete without a few general comments on the role of steroids and corticotropin in this problem. Although medical literature is replete with articles on the use of steroids in allergic disorders, the mechanism by which they alleviate asthma still is not established. They relieve stress, and essentially their use is symptomatic. Some evidence indicates that their usefulness is on the basis of an antihyaluronidase effect.

It is fair to state that the most common misuse of steroids is their overuse. We believe that the following are the main indications for employing steroids or corticotropin in this group of patients: (1) serious asthma which has not responded to standard therapeutic procedures, (2) asthma so critical as to allow no time either to try simpler measures or to assess contraindications for steroids, (3) acute exacerbation in a patient in whom steroids had been used continuously for several months already (an indication for increased dosage as a temporary expedient), (4) the need to get an asthmatic who requires surgical treatment into the best preoperative condition as quickly as possible, and (5) the desirability of an added margin of safety against the extra stress of surgical treatment for a patient who needs an operation and who has been using steroids for several weeks or months.

The advantage of steroid therapy is that usually it will control the symptoms of asthma effectively and rapidly, whether they are of extrinsic or of intrinsic origin; but there are several disadvantages. Steroids cause atrophy of the adrenal cortex, and use of corticotropin may lead to degenerative changes in the anterior lobe of the pituitary. The asthmatic symptoms often tend to recur within three to four weeks after administration of steroids is stopped. Their prolonged use is dangerous; many undesirable conditions are brought on or aggravated by them and therefore contraindicate their employment. Examples of conditions thus brought on are osteoporosis, diabetes mellitus, and hypertension; those aggravated by steroids include pulmonary tuberculosis and peptic ulcers.

The method of administering steroids varies among competent workers. Some advise continuous use over long periods and speak of the initial clearing dosage and the subsequent maintenance dosage. We prefer the use of short, intensive courses of perhaps 3 to 10 days' duration, with repetition of these at intervals if necessary. The selection of a preparation for use is a matter of individual preference, but it seems likely that, milligram for milligram, prednisone and prednisolone are more effective than other steroids and are less likely to cause changes in the electrolytes of the body.

## Comment

The management of asthma remains a problem of many facets. It is not too difficult to outline didactically a program of treatment, but in practice all of us will encounter cases that will tax our therapeutic ingenuity to the limit. Finally, medicines afford only symptomatic relief, and none is good enough to overcome the bad effects of poor environmental control.

## References

1. Rasmussen, H.: Iodide Hypersensitivity in Etiology of Periarteritis Nodosa, J. Allergy **26**:394-407 (Sept.) 1955.
2. Hurst, A.; Levine, M. H.; and Rich, D. R.: Radioactive Iodine in Management of Patients with Severe Pulmonary Emphysema, Ann. Allergy **13**:393-397 (July-Aug.) 1955.
3. Mears, T. W.; Prickman, L. E.; and Moersch, H. J.: Bronchostenosis Complicating Asthma, J. A. M. A. **152**: 997-1000 (July 11) 1953.
4. Mitchell, R. E., Jr.; Derbes, V. J.; and Akenhead, W. R.: Rupture of Esophagus: Two Instances of Hitherto Undescribed Complication of Status Asthmaticus, Ann. Allergy **13**:15-28 (Jan.-Feb.) 1955.

---

**HODGKIN'S DISEASE.**—In 1832 Sir Thomas Hodgkin collected and described seven cases of combined lymphadenopathy and splenomegaly. It detracts but little from his observation that some of these cases were later proved to suffer from illnesses other than that which we now call Hodgkin's disease. Wilkes added to the clinical description of the entity in 1865, and memorialized Hodgkin by applyng his name to the disease. Greenfield in 1878 provided . . . the initial pathological description which was further developed by Goldman in 1892 and Sternberg in 1898. Dorothy Reed recognized and emphasized the importance of the characteristic giant cells, now named for her, in 1902. The etiology of Hodgkin's disease remains entirely unexplained. Initially various microorganisms including the tubercle bacillus, brucella, diphtheroid organisms, and several mycotic forms were incriminated. However, most workers now feel that these were accidental contaminants. An extensive review of the investigative evidence relating to viruses as possible etiologic agents in Hodgkin's disease has been presented by Bostick. Some authors have emphasized the neoplastic nature of the disease, and have stressed the clinical and histologic relationship between this entity and other lymphatic tumors. In considering this problem it should be remembered that no infectious agent or serological reaction has been consistently identified in this illness, nor has the lesion been reproduced in or transmitted to laboratory animals, although a reticulum cell neoplasm of mice, described by Dunn, bears a considerable morphologic resemblance to Hodgkin's disease.—F. A. Brown and H. S. Kaplan, Hodgkin's Disease; A Revised Clinical Classification and an Approach to the Treatment of Its Localized Form, *Stanford Medical Bulletin*, August, 1957.

# ELECTRIC STIMULATION OF BREATHING IN CHRONIC LUNG DISEASES

George W. Holmes, M.D., William B. Buckingham, M.D., David W. Cugell, M.D.
and
Kurt Kirchner, M.D., Chicago

*The efficacy of intentionally deep breathing in the treatment of chronic pulmonary disease has been questioned. The method here described employs a portable generator of electrical stimuli. A band-like electrode applied along the costal margin stimulates the peripheral portions of the diaphragm for inspiration; a pair of flat electrodes applied over the two parts of the m. rectus abdominis induces expiration. Intensity and timing can be adjusted. Treatments lasting 10 to 15 minutes were given two or three times a week to 34 patients with pulmonary conditions that were not responding to other therapeutic measures. A group of 13 patients with chronic obstructive pulmonary emphysema proved to be the most difficult to evaluate and had the least satisfactory clinical responses. In the remaining patients (five with empyema, seven with traumatic conditions, and nine recovering from lobectomy) evidence from ventilation measurements, chest roentgenograms, and other criteria showed significant improvement during the weeks of treatment. It is pointed out that a series of comparable untreated patients is difficult, if not impossible, to acquire. The treatment seemed to hasten the resolution of exudates and the mobilization of the diaphragm. The patients accepted it readily and showed no adverse effects.*

The prevention of bronchial infection, pulmonary congestion, and atelectasis in postoperative patients, or people otherwise rendered relatively immobile, is often attempted by exhorting the patient to "take a deep breath." Intermittent carbon dioxide inhalation, blowing up balloons, pounding on the chest, frequent postural changes, and a host of other measures have also been employed. The purpose of all such maneuvers is to promote bronchial drainage, to prevent the accumulation of secretions, and to thus maintain a patent airway to the lungs.

Active, forced breathing efforts by the patient have also been employed as a therapeutic measure in chronic empyema and obstructive pulmonary emphysema. In chronic pleural disease the regular use of breathing exercises is said to accelerate the resolution of fibrinous and hemorrhagic exudates within the pleural cavity.[1] Patients with chronic obstructive pulmonary emphysema have been treated with graded breathing exercises in an attempt to improve ventilation by utilizing the abdominal musculature for active participation in the expiratory phase of the breathing cycle.

It is difficult to ascertain whether breathing exercises have any significant value in the various conditions for which they have been advocated. Wide clinical experience is necessary because a series of comparable untreated patients as controls is difficult, if not impossible, to acquire. In any individual case of chronic pleural disease it may not be possible to know whether the use of breathing exercises significantly accelerates the healing process. From their broad experience with 600 patients with empyema, Sellors and Cruickshank [1] believed their exercises to be definitely beneficial. In chronic obstructive emphysema, breathing exercises have been reported as favorable [2] and also as of no benefit.[3] Both points of view are supported by the results of pulmonary function tests.[4] These diverse opinions emphasize the difficulty of evaluating the results of long-term therapy in any chronic disease.

Patients who are debilitated by chronic illness may be unable to exert the necessary physical and mental effort to perform breathing exercises properly. The use of electric muscle stimulation might augment the respiratory effort to produce a maximal contraction of the breathing musculature and thus increase the tidal volume. Becklake and associates [5a] used electric stimulation during expiration in conjunction with breathing exercises for the therapy of chronic obstructive emphysema but noted no additive effect. Dr. Hofmann, of Germany, has designed an apparatus which electrically stimulates the respiratory musculature during both inspiration and expiration.[5] It has been used in Europe on patients with asthma, emphysema,[6] bronchitis and silicosis.[7] Increased exercise tolerance, weight gain, and improved vital capacity were reported.[5] The improvement was attributed to better diaphragmatic motion, increased contraction of the accessory muscles of respiration, improved venous return to the heart, and fewer postoperative pulmonary complications.[8] Occasional vital capacity determinations, before and after treatment, were

From the Chest Disease Hospital of Cook County Hospital and the Department of Medicine, Northwestern University Medical School.

performed,[7] but otherwise the results of therapy were not substantiated by laboratory data. In poliomyelitis and cardiovascular diseases, inconstant benefit was noted.[8] This paper reports our experiences with a Hofmann device in a group of patients with various chronic pleural diseases and in another group with chronic obstructive emphysema.

## Materials and Methods

The stimulator is a portable machine, weighing approximately 11 kg., which operates from a 110 or 220 volt alternating current source. The machine consists of a power supply, automatic timing circuit which controls the breathing frequency and the relative duration of each phase, various electrodes for application to the chest and abdomen, and a manual switch for emergency cut-off or manual control of the duration of each phase of respiration. In normal operation, the inspiration and expiration circuits are alternately switched on and off automatically. The respiratory frequency can be varied from 6 to 60 per minute and the time ratio of the duration of inspiration and expiration can be adjusted from 1:1 to 1:2. With the manual control, expiration can be prolonged to any desired duration. Current strength is independently variable in each circuit.

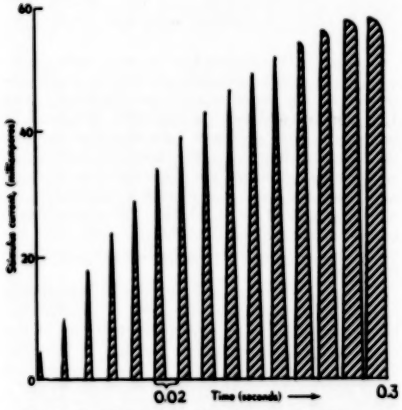



Fig. 1.—Waveform of applied stimulus. Impulses occur every 20 msec. and gradually increase in intensity for 0.3 seconds at which time they reach maximal value for which machine has been set.

The apparatus supplies a series of impulses 20 msec. apart of gradually increasing intensity and duration (fig. 1 and 2). Peak current can be adjusted up to a maximum of 120 ma., which corresponds to a meter reading on the machine of 6 ma. because the inertia of the milliameter is such that it gives an average reading throughout each phase of the respiratory cycle. Voltage depends upon the resistance of the skin and the particular muscle groups being stimulated. The stimuli evoke a painless, gradually increasing, tetanic contraction which can be blocked by curare.

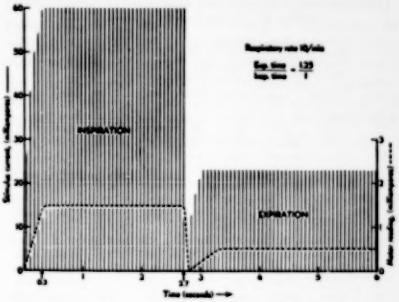



Fig. 2.—Graphic representation of applied stimulus when breathing frequency is set at 10 per minute, inspiratory current at 1.5 ma., expiratory current at 0.5 ma., and ratio of expiratory to inspiratory time is 1.25:1.

The machine is operated in the following manner: Two plate-like electrodes are applied to the abdomen at the level of the umbilicus and a band-like electrode is placed around the lower portion of the thoracic cage. The rectus abdominis muscles are stimulated to contract which augments expiration, and then the peripheral portion of the diaphragm is stimulated to contract which assists inspiration. The pectoralis musculature may be stimulated simultaneously with the rectus abdominis by bilateral application of plate electrodes to the upper thorax. If the arms are relaxed, stimulation of the pectoral musculature causes the shoulders to roll in toward the mid-line and a slight diminution in the size of the upper thorax results. The purpose of the apparatus is to aid the existing respiratory drive. Best results are obtained by initially adjusting the frequency of respiration and the ratio of the duration of the two phases to correspond to those of the patient. After the patient's cooperation has been secured, these parameters can be altered by changing the appropriate controls. With high current intensities (meter readings of 4 to 6 ma.) the patient cannot breathe in opposition to the machine. The number of treatments per patient (2 to 3 per week) varied from a minimum of 9 to a maximum of 116 during a period of from two weeks to nine months. Individual treatments, after a brief familiarization period, lasted approximately 10 to 15 minutes.

Simple ventilatory tests were performed on all but one patient before and after a course of electric stimulation. A 13.5 liter water spirometer was used for all tests. Resting minute ventilation and oxygen consumption were recorded with the patient supine. The ventilatory equivalent (liters of ventilation per 100 cc. of oxygen consumed) was calculated from these values.[10] Several vital capacity efforts, separated by brief intervals of normal breathing, were then recorded with the patient upright. After removing the valves and carbon dioxide absorber from the spirometer the maximal breathing capacity was measured.[10] Vital capacity and maximal breathing capacity were repeated two to four times or until a constant value was obtained. All gas volumes (see table) were expressed at ambient barometric pressure, body temperature and saturated with water vapor. All measurements were completed within 48 hours before the start and after the completion of a course of electric stimulation treatments. Chest roentgenograms at full inspiration and expiration were taken on most patients at the beginning and conclusion of their electric stimulation therapy. The excursion of each diaphragm at its midpoint was measured (see table).

*Diaphragmatic Excursion and Ventilation Measurements in Patients Receiving Electric Stimulation*

| Case No. | Change in Maximum Range of Diaphragmatic Excursion, Cm. | | Maximum Breathing Capacity Liters/Min. | | Inspiratory Reserve Volume, Liters | | Vital Capacity Liters | |
|---|---|---|---|---|---|---|---|---|
| | Right | Left | Before | After | Before | After | Before | After |
| **Group 1, empyema** | | | | | | | | |
| 1 | +1.5* | −2.0 | 46 | 96 | 1.53 | 1.99 | 2.58 | 2.87 |
| 2 | 0.0 | +2.5* | 15 | 83 | 2.09 | 2.37 | 3.33 | 3.47 |
| 3 | 0.0 | +1.5* | 22 | 49 | 0.43 | 0.53 | 0.47 | 0.66 |
| 4 | +1.5 | +7.5* | 46 | 73 | 0.79 | 1.01 | 1.32 | 1.58 |
| 5 | +3.5 | +2.5* | 31 | 42 | 1.05 | 1.46 | 1.27 | 1.73 |
| Mean | | | 33 | 69 | 1.18 | 1.47 | 1.80 | 2.06 |
| SD† | | | 13 | 21 | 0.64 | 0.74 | 1.13 | 0.84 |
| p< | | | 0.05 | | 0.02 | | 0.01 | |
| **Group 2, chronic hemothorax** | | | | | | | | |
| 6 | +1.5* | 0.0 | 121 | 128 | 1.22 | 2.05 | 1.62 | 3.78 |
| 7 | +1.5 | +6.5* | 85 | 89 | 1.35 | 1.74 | 1.79 | 2.48 |
| 8 | +2.0* | +2.0 | 95 | 153 | 1.76 | 1.91 | 2.37 | 3.11 |
| 9 | +2.5 | +3.0* | 61 | 124 | 1.37 | 1.76 | 2.08 | 2.46 |
| 10 | +1.5* | +1.0 | 73 | 95 | 1.49 | 1.89 | 1.93 | 2.59 |
| 11 | 0.0 | +4.5* | 54 | 78 | 1.24 | 1.37 | 1.77 | 2.65 |
| 12 | 0.0 | +1.0* | 113 | 128 | 1.99 | 2.71 | 3.18 | 3.67 |
| Mean | | | 86 | 114 | 1.49 | 2.09 | 2.11 | 2.96 |
| SD† | | | 26 | 25 | 0.28 | 0.52 | 0.57 | 0.58 |
| p< | | | 0.05 | | 0.02 | | 0.01 | |
| **Group 3, lobectomy** | | | | | | | | |
| 13 | +3.5 | +6.0* | 124 | 163 | 1.30 | 2.10 | 1.82 | 3.06 |
| 14 | ... | ...* | 110 | 123 | 2.03 | 2.17 | 2.78 | 3.06 |
| 15 | −1.0 | +0.5* | 32 | 54 | 0.48 | 1.02 | 0.74 | 1.58 |
| 16 | +1.0 | +2.0* | 58 | 70 | 1.32 | 1.82 | 1.54 | 2.03 |
| 17 | 0.0 | +3.0* | 46 | 68 | 1.40 | 2.06 | 2.28 | 2.94 |
| 18 | +1.0* | +0.5 | 53 | 64 | 1.00 | 1.51 | 1.57 | 1.95 |
| 19 | +1.0 | +5.5* | 82 | 118 | 1.66 | 2.05 | 1.97 | 3.14 |
| 20 | +2.0* | +0.5 | 54 | 95 | 1.15 | 1.80 | 1.68 | 2.50 |
| 21 | +5.5* | 0.0 | 39 | 56 | 1.19 | 1.46 | 1.32 | 1.60 |
| Mean | | | 66 | 90 | 1.28 | 1.78 | 1.74 | 2.43 |
| SD† | | | 32 | 35 | 0.42 | 0.35 | 0.60 | 0.65 |
| p< | | | 0.01 | | 0.01 | | 0.01 | |
| **Group 4, emphysema** | | | | | | | | |
| 22 | +1.5 | +0.5 | 17 | 22 | 0.62 | 0.98 | 0.75 | 1.16 |
| 23 | 0.0 | +2.0 | 42 | 58 | 0.98 | 1.18 | 1.25 | 2.27 |
| 24 | +2.0 | +1.5 | 17 | 19 | 0.58 | 1.14 | 0.85 | 1.97 |
| 25 | +2.5 | +2.0 | 29 | 25 | 1.32 | 1.86 | 2.20 | 2.46 |
| 26 | +2.5 | +1.0 | 15 | 30 | 1.84 | 1.86 | 1.97 | 2.69 |
| 27 | +2.5 | +3.0 | 34 | 66 | 1.93 | 2.81 | 2.28 | 3.25 |
| 28 | 0.0 | +2.0 | 55 | 70 | 1.89 | 2.17 | 2.71 | 3.17 |
| 29 | ... | ... | 29 | 39 | 1.35 | 1.70 | 1.61 | 2.57 |
| 30 | +1.5 | +4.0 | 22 | 25 | 1.94 | 1.56 | 2.60 | 1.92 |
| 31 | +4.0 | +4.5 | 36 | 42 | 2.05 | 2.25 | 2.18 | 2.43 |
| 32 | +1.0 | +2.0 | 22 | 30 | 1.31 | 1.81 | 1.57 | 2.47 |
| 33 | ... | ... | 17 | 29 | 0.78 | 1.09 | 1.91 | 1.96 |
| 34 | −1.0 | −0.5 | 32 | 30 | 1.69 | 1.55 | 2.22 | 1.86 |
| Mean | | | 28 | 37 | 1.41 | 1.69 | 1.78 | 2.27 |
| SD† | | | 12 | 18 | 0.52 | 0.53 | 0.66 | 0.62 |
| p< | | | 0.01 | | 0.01 | | 0.01 | |

* Involved side.
† Standard deviation.

The effect of electrically stimulating the breathing musculature is similar to, if not identical with, forced breathing by the patient with an increase of tidal volume and a decrease in frequency; thus, therapy with this machine should be beneficial in those disorders for which breathing exercises have previously been advocated. The 34 patients treated with this device were selected from a chest disease unit of a large general hospital and were primarily those who failed to respond to other therapeutic measures, or had some postoperative complications, or were disabled by advanced obstructive pulmonary emphysema.

The patients have been divided into four groups: (1) patients with chronic empyema, (2) those with chronic hemothorax, (3) those with pleural exudate after lobectomy, and (4) patients with chronic obstructive diffuse pulmonary emphysema (see table).

*Group 1.*—There were five patients with empyema; three with long-standing infections previously treated by rib resection and open drainage (cases 1, 2, and 3), and two patients with symptoms of briefer duration and prior tube drainage only. In the long-standing cases the involved hemithorax was diminished in size, the diaphragm was elevated and fixed, and there was excessive purulent drainage. One patient (case 3) also had a moderately severe scoliosis. From 10 to 40 treatments were administered over a three to eight week interval in this group.

*Group 2.*—There were three cases of hemothorax caused by stab wounds, two cases of spontaneous hemopneumothorax, one of gunshot wound of the chest, and one of traumatic fracture of the ribs. There was definite limitation of diaphragmatic and chest wall motion in all patients. One (case 7) had a stab wound of the left side of the chest and incomplete surgical removal of the blood which had accumulated. None of the other patients in this group had any surgical procedures other than needle aspiration or closed tube drainage. Electric stimulation therapy was started from three to eight weeks after the injury, at which time the patients' roentgenograms of the chest showed little or no improvement. The average total number of treatments administered per patient was 22 (range 9-32).

*Group 3.*—Nine patients had recent upper lobectomies for various disease entities. There was the usual postoperative pleuritis, residual fluid, and occasionally some blood in the remaining space. The diaphragm was elevated and fixed on the operated side. Electric stimulation was instituted from one to four weeks postoperatively and continued approximately three times weekly for 3 to 10 weeks.

*Group 4.*—There were 13 patients with chronic obstructive pulmonary emphysema; 8 were hospitalized because of intercurrent infection at the time their treatment was instituted, and the remainder were outpatients who came in regularly for their therapy. All patients were totally disabled and extremely short of breath. Patients with marked evidence of congestive failure were excluded from this study. Electric stimulation was given approximately three times weekly during a 3 to 39 week period.

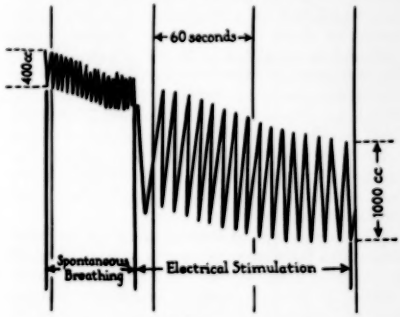
## Results

The effect of electric stimulation was evaluated on the basis of (1) clinical observation of the patient, (2) comparison of the changes in simple ventilatory tests before and after treatment, and (3) comparison of the change in diaphragmatic excursion measured from roentgenograms of the chest. There were no adverse effects from electric stimulation, and patient acceptance was excellent. Most of those treated reported some benefits such as less interruption of sleep, relief of dyspnea, and an improved sense of well-being. The ventilatory tests before and after treatment for each patient and the change in maximal diaphragmatic excursion are listed in the table. There was no significant change in oxygen uptake or ventilation as a result of treatment and they have been omitted from the table.

In the patients in group 1 (empyema), drainage promptly decreased or disappeared, and the tube was removed from three patients shortly after the period of treatment. The two patients with symptoms of brief duration were able to resume their former activities and no residual empyema space was evident. The scoliosis of one patient (case 3, age 12) was greatly improved. There was a definite increase in the range of diaphragmatic excursion (1.5 to 7.5 cm.) on the involved side and considerable improvement on the opposite side as well in three patients. The maximal breathing capacity and vital capacity improved in all patients but remained at abnormally low values in two patients (cases 3 and 5). The improvement in vital capacity was entirely due to an increase of inspiratory volume, as the expiratory reserve was not significantly altered.

The patients in group 2 with chronic hemothorax showed remarkable clinical improvement. There was prompt resolution and absorption of the hemothorax to the extent that decortication was unnecessary. All patients were able to resume their former occupations after the completion of electric stimulation therapy. Diaphragmatic motion improved considerably, even on the opposite side in one-half of this group. Ventilatory tests demonstrated improved function in all patients. The range of increase in maximal breathing capacity was from 4 to 63 liters per minute. The average increase of 28 liters per minute was statistically significant at the 5% level. The average pretreatment maximal breathing capacity of 86 liters per minute indicated relatively good function at the onset of treatment in contrast with all other groups. The mean improvement in vital capacity was 0.85 liters ($p < 0.01$) and, in contrast to the maximal breathing capacity, the vital capacity was considerably reduced in all patients before treatment. The age range of this group was 21 to 42 years (average 29), the lowest of any of the four groups.

The patients in group 3 (postlobectomy) were in general considerably improved after electric stimulation. The clinical response was comparable to that observed in the patients with hemothorax.




LEGENDS

Fig. 3.—Spirometric tracing of patient with chronic obstructive pulmonary emphysema during electric stimulation and spontaneous breathing.

During the second week of treatment a pleural friction rub was audible over the involved hemithorax in seven of the nine patients. This subsequently disappeared during the next week or two of treatment. All patients left the hospital feeling well. Diaphragmatic excursion improved in most patients and, as noted in the previous two groups, was frequently improved on the uninvolved side. The maximal breathing capacity ranged from a low of 32 to a high of 124 liters per minute before treatment. Increase in maximal breathing capacity was greatest in those patients with the largest pretreatment maximal breathing capacities, but percentage-wise was greatest in those with the lowest pretreatment values. Comparable improvement of the vital capacity occurred.

The patients in group 4 with chronic obstructive emphysema were the most difficult to evaluate and had the least satisfactory clinical responses. The hospitalized patients were slightly improved and could be discharged but other supportive therapy was administered during the period of hospitalization. The outpatients who came to the laboratory regularly for treatment were not improved, and their severe dyspnea persisted. There was a marked change in the breathing pattern of the patients with emphysema during electrically stimulated breathing. Before treatment, inspiration was rapid and gasping in nature, while expiration was prolonged. With electric stimulation the breathing frequency decreased and the tidal volume increased. With the cessation of electric stimulation, breathing immediately resumed its former rapid, shallow pattern. Figure 3 is retraced from a spirogram of a patient with emphysema during spontaneous and during electrically assisted breathing. If an arbitrary physiological dead space of 200 cc. is assumed for this patient, then the alveolar ventilation during electric stimulation at a frequency of 8 per minute would be 6,400 cc. per minute, whereas during spontaneous breathing at 20 per minute it would be only 4,000 cc. Minute ventilation measured at the mouth would be 8,000 cc. at both breathing frequencies. Some of the patients with emphysema were unable to lie down, and treatment was started while they were in a semirecumbent position. Immediately after the reduction of the respiratory rate and increase in tidal volume (fig. 3), they could lie flat with no discomfort.

The average age of these patients was 59 years. From 6 to 116 treatments over a period of 3 to 39 weeks were administered. No correlation between change in clinical status or ventilatory function and the duration of treatment was apparent. In 10 of the 11 patients on whom satisfactory inspiratory and expiratory roentgenograms of the chest were available, there was some improvement in diaphragmatic excursion as a result of therapy. Sinclair [26] noted an average increase in diaphragmatic excursion of 3.1 cm. ($p < 0.001$) in 22 patients with emphysema treated with breathing exercises. After further analysis he found that these changes resulted from vertical thoracic motions and that if the measured diaphragmatic excursion was corrected for the vertical shift of the thorax, which frequently occurs during forced breathing, there was no change after breathing exercises. We did not correct our measured diaphragmatic excursions for any vertical chest motion. Improvement in all ventilatory tests was statistically significant but the magnitude of the improvement was small, and in no case did therapy result in a normal maximal breathing capacity. The vital capacity increase (0.49 liters) was primarily the result of an increased inspiratory reserve capacity, so that the elevated end-expiratory lung volume, which is abnormally large in emphysema patients, was increased still further.

## Comment

Breathing exercises, as generally performed,[11] emphasize either the expiratory or inspiratory phase of the breathing cycle. In patients with emphysema the function of the abdominal muscles in augmenting expiration is emphasized. The aim is to improve tidal exchange and reduce the functional residual volume. For patients with certain types of localized parenchymal or pleural disease the term breathing exercises implies the regular use of large inspiratory efforts which produce an increase in tidal volume by utilizing some or all of the inspiratory reserve capacity.[12] All types of breathing exercises require the active effort of the patient. He may be unable to exert that effort for a variety of reasons or he may be incapable of understanding what is required of him. If the necessary stimuli to produce an increased tidal volume can be externally applied, he may promptly understand what is expected of him, and we need not depend on his active cooperation.

The Hofmann apparatus alternately stimulates both the inspiratory and expiratory musculature or can be used to stimulate during only one phase of the breathing cycle if one pair of electrodes is disconnected. All the patients reported here were stimulated during both inspiration and expiration. The effect of such dual stimulation is grossly similar to voluntarily increasing the tidal volume by reducing end-expiratory and end-inspiratory volumes. Electric stimulation in this manner differs from breathing exercises in which the emphasis is on the inspiratory or the expiratory phase but not on both.

The value of breathing exercises in patients with chronic empyema was stressed by Sellors and Cruickshank [1] in their exhaustive review of 600 cases. Active inspiration was recommended as the best means of expanding a collapsed lung or lobe. Hayward [11a] claimed great benefit from breathing exercises in both traumatic and inflammatory pleural disease, not only for accelerating the resolution of pleural exudate and hemorrhage but also for correcting the associated deformity of the thoracic cage, which often occurred. Unfortunately, neither of these reports include any pulmonary function data. In chronic obstructive pulmonary emphysema, the value of breathing exercises is less certain. Reports based on clinical impressions are generally favorable.[27] When pulmonary function tests were done before and after treatment, the effect of breathing exercises was less certain.[4] Filley [28] thought the results beneficial on the basis of clinical improvement plus a measurable decrease in ven-

tilation for a given work-load on the treadmill. On the other hand Miller,[27] who likewise considered breathing exercises beneficial in obstructive emphysema patients, attributed the improvement to increased ventilation during exercise. Sinclair [28] noted "slight but not significant improvement in lung function after a course of breathing exercises." Becklake and associates [3a] noted no benefit from breathing exercises alone, electrically stimulated expiration alone, or a combination of the two.

Although not substantiated by physiological studies, the reports of the value of breathing exercises in pleural disease are uniformly favorable.[13] Our experiences with electric stimulation are similar. The normal healing processes were accelerated, decortication was unnecessary in those cases where it was originally considered, the range of diaphragmatic motion increased on the involved side and frequently on the opposite side as well. The frequent early appearance of a transient pleural friction rub in the postoperative patients coincided with improved diaphragmatic function and the disappearance of pleural exudate. In obstructive emphysema patients, the clinical benefit was meager despite a small, but statistically significant, improvement in maximal breathing capacity and vital capacity.

Despite the limited facilities available for pulmonary function testing of these patients, there was good correlation between the improvement of those functions measured and the clinical results after electric stimulation in the patients with unilateral pleural disease. The adverse influence of unilateral pleural disease upon the function of the opposite lung has previously been demonstrated.[14] Differential lung function was not measured in any of our patients, but improvement in diaphragmatic excursion was often noted in the contralateral hemithorax after treatment. This suggests that electric stimulation helped restore functional capacity by accelerating the resolution of pleural exudate and mobilizing the diaphragm on the affected side, permitting more normal function of both lungs. The large tidal volumes and increased alveolar ventilation which can be produced by electric stimulation suggest other uses for this apparatus. It might successfully combat acute carbon dioxide retention and narcosis and may be useful in other types of respiratory depression.

## Summary

An electric device which painlessly stimulates the breathing musculature and augments ventilation was used for a group of patients with various chronic pleural diseases and chronic obstructive emphysema. In patients with unilateral medical and surgical pleural disease there was a prompt decrease in the amount of exudate, rapid return of diaphragmatic function, and decreased morbidity. Chronic obstructive emphysema patients were not significantly improved by electric stimulation despite a small but statistically significant increase in maximal breathing capacity and vital capacity. The clinical results were supported by simple ventilatory measurements and chest roentgenograms.

670 N. Michigan Ave. (14) (Dr. Holmes).

The Hofmann device used in this study was supplied by J. H. Emerson Company, Cambridge, Mass.

## References

1. Sellors, T. H., and Cruickshank, G.: Chronic Empyema, Brit. J. Surg. **38**:411-432 (April) 1951.

2. (*a*) Dorinson, S. M.: Breathing Exercises as Adjunct in Treatment of Bronchial Asthma and Pulmonary Emphysema, Am. Pract. **3**:550-554 (May) 1949. (*b*) Filley, G.: Physiological Effects of Breathing Exercises in Patients with Pulmonary Emphysema, Proceedings Committee on Medical Research, New York, American Trudeau Society, Nov. 15, 1954. (*c*) Miller, W. F.: Physiologic Evaluation of Effects of Diaphragmatic Breathing Training in Patients with Chronic Pulmonary Emphysema, Am. J. Med. **17**:471-477 (Oct.) 1954.

3. (*a*) Becklake, M. R.; McGregor, M.; Goldman, H. I.; and Brando, J. L.: Study of Effects of Physiotherapy in Chronic Hypertrophic Emphysema Using Lung Function Tests, Dis. Chest **26**:180-191 (Aug.) 1954. (*b*) Sinclair, J. D.: Effect of Breathing Exercises in Pulmonary Emphysema, Thorax **10**:246-249 (Sept.) 1955.

4. References 2*b*, *c*, and 3.

5. Sauerwein, E., and Klotz, L.: Die Behandlung pulmonaler Erkrankungen mit der Elektro-Lunge, Med. Klin. **47**:417-418 (March) 1952.

6. Knodt, H.: Die Behandlung des Asthma bronchiale und Emphysema mit der Elektrolunge, Berliner Gesundheitsblatt **2**:235, 1951.

7. Haslreiter, E., and Zimmer, R.: Die Elektrolunge als Hilfsmittle bei der Kurbehandlung von Staublungenkrankheiten, München. med. Wchnschr. **94**:505-508 (March 14) 1952.

8. Gerhart, A.: Erfahrungen über die postoperative Beatmung mit der Elektro-Lunge, Beitr. klin. Chir. **187**:247-252, 1953.

9. Debrunner, H. U.: Die Elektrolunge in der Nachbehandlung der Poliomyelitis, Praxis **42**:793-794 (Sept. 6) 1953. Mansmann, I.: Elektrische Tiefenbeatmung bei Herz und Kreislaufschaeden, Fortschr. d. Med. **70**:1429, 1952.

10. Motley, H. L.: Use of Pulmonary Function Tests for Disability Appraisal: Including Evaluation Standards in Chronic Pulmonary Disease, Dis. Chest **24**:378-389 (Oct.) 1953.

11. (*a*) Hayward, J. I.: Physiotherapy in Chest Surgery, Australian & New Zealand J. Surg. **13**:247-260 (April) 1944. (*b*) Smith, O. F. G.: Rehabilitation, Re-education and Remedial Exercises, Baltimore, The Williams and Wilkins Company, 1943. (*c*) May, E. A.: Physical Therapy in Medical Diseases of Chest, Phys. Therapy Rev. **32**:121-126 (March) 1952. (*d*) Reference 2*a*.

12. References 1, 11*a*, *b*, and *c*.

13. References 1, 11*b* and *c*.

14. Gaensler, E. A.: Bronchospirometry: I. Review of Literature, J. Lab. & Clin. Med. **39**:917-934 (June) 1952.

# POSTMASTECTOMY DRESSING WITH SUCTION, ATMOSPHERIC PRESSURE, AND BREAST BINDER

George B. Sanders, M.D.
and
David W. Kinnaird, M.D., Louisville, Ky.

*Modification of the postmastectomy dressing routine to include continuous suction, a commercial breast binder, and the avoiding of occlusive pressure dressings for all simple and radical mastectomies has resulted in improved general condition and comfort of patients, with vast improvement in the preservation of viability, and with the healing of the skin flaps. The routine of frequent easy dressing change adds greatly to the comfort of the patient. Patients can be allowed out of bed, with the suction tube clamped for short intervals, as early as desired.*

Adequate dressing care of patients who have undergone mastectomy is always a problem, as yet not ideally handled. In ultraradical techniques, flaps are very thin, undermining is extreme, and serosanguinous oozing is a great problem. As a result, the viability of the skin flaps is precarious, resulting often in degrees of circulatory embarrassment varying from simple vesiculation, partial thickness loss, and marginal necrosis to massive loss of flaps requiring secondary grafting procedures. These conditions are encountered not only after radical mastectomy but after extensive simple mastectomy techniques aimed at complete extirpation of mammary tissue. Numerous methods for the prevention of these complications have been devised and include various forms of pressure dressings, flap fixation by quilting or subcutaneous sutures, elaborate drains, or the avoidance of them. Even complete detachment of skin flaps, with reapplication as free grafts, has been recommended.

No method, until recently, has been outstandingly successful in the care and protection of thin skin flaps. Consequently, there has been a strong tendency, for practical reasons, toward the cutting of thicker flaps than those permitted in ideal mastectomy techniques. Difficulties have also been encountered with fairly thick flaps, only shamefully thick and inadequately undermined flaps being regularly immune from the stigmata of delayed healing. It is not the purpose of this paper, however, to discuss controversial issues such as amount of skin resected, thickness of flaps developed, or the pros and cons of routine skin grafting at the time of mastectomy.

It is the usual experience that even ultrathin flaps appear viable at the conclusion of mastectomy, provided that they have not been sutured under tension and that "stay sutures" have not been used in the closure. A "pressure," or occlusive and immobilizing dressing, is then customarily applied, according to the best tenets of plastic surgery. When this is removed five to seven days later, there is often disclosed a miserable condition of the flaps with varying degrees of necrosis due to circulatory embarrassment. Since the interval between the development of the skin flaps and the termination of mastectomy may be two to four hours, and since, after this long interval the flaps usually look healthy, it has seemed to us that, barring accidents or gross technical errors, the occlusive dressings customarily applied may have been partly responsible for these poor results.

In very extensive burns, it has often been apparent that voluminous occlusive dressings, which become so much foul garbage after a few hours, may cause serious damage by maceration, constriction, abrasion, filing, and semiavulsion of surface tissues. It has been instructive to see much of this avoided by open and semi-open treatment of such burns. It occurred to us that, if the advantages of a semi-open type of dressing could be secured for the mastectomy patient, the evil effects of undue pressure upon delicate flaps over bony prominences such as the ribs, costal cartilages, and sternal border would be neutralized and the health of the flaps improved. At the same time it is recognized that skin flaps have to be intimately opposed to a vascular substrate to survive and that the large axillary dead space has to be evacuated of serum, blood, and air.

The fundamentals of suction drainage after mastectomy were first described by Murphey [1] in 1947 and subsequently by Raffl [2] in 1952 and Silvis and associates [3] in 1955. Whereas Murphey employed intermittent suction with a syringe every 12 hours, adjusting the position of the catheter to evacuate serum collections, Raffl and Silvis have used continuous suction but have stressed infrequent dressings. Raffl and Murphey felt that suction was unsuitable where grafts were used. Silvis has used suction in graft cases, with care not to disturb graft take by early dressing. Flaps thus subjected to negative pressure beneath are, in effect, compressed from above by the even diffuse pressure of the atmosphere at about 760 mm. Hg. This salubrious

Associate Professor of Surgery (Dr. Sanders) and Instructor of Surgery (Dr. Kinnaird), the Department of Surgery, University of Louisville Medical School, and the Surgical Service, Norton Memorial Infirmary.

V 1
195

effect can be spoiled by adherent or occlusive dressings, which can, by resisting the positive pressure of the atmosphere, actually adhere to and hold portions of flaps away from their bed. A light nonocclusive dressing which can be changed easily,

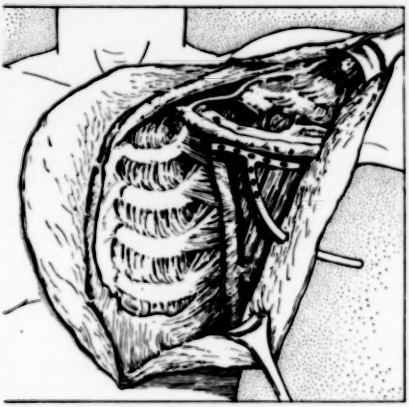


Fig. 1.—Position of T-tube in latissimus gutter and beneath axillary vessels.

frequently, and painlessly, avoids this and other mechanical hazards to the flaps and provides valuable opportunities for adjustment of the suction tube and aspiration of remote fluid collections.

The fixation and "take" of skin grafts on the chest wall in constant respiratory movement is not as easy or as certain as elsewhere. It can be greatly facilitated by a "stent" type dressing in which an immobilizing pack is held in place over the graft by the tying of long ends of marginal sutures over the back. This type of dressing fixes and isolates the graft from the remainder of the mastectomy area. Continuous suction drainage can then be employed with little or no dressing over the flaps themselves, permitting daily dressing changes, inspection, aspiration, adjustments, and the like with no disturbance to the graft.

## Method

For the past 10 years, we have been employing exclusively an ultraradical mastectomy patterned after the technique of Haagensen, deliberately excising a wide central area of mammary skin, and resorting to skin grafting to cover the defect. The skin flaps are cut extremely thin with 1 to 3 mm. of subcutaneous tissue attached. At the conclusion of the mastectomy, the flaps are gently reapposed to the underlying chest wall, with the surgeon striving always to cover the axillary vessels and brachial plexus with the superior portions of the flaps. The margins of the flaps are sutured to the chest wall without the least tension by means of interrupted sutures of fine cotton, the ends of which are left long. The central defect is covered with a thick split-skin graft which is held in place with fine interrupted cotton sutures. No quilting sutures are employed to fix graft or flaps, and no vents are cut in the graft.

Previously, we had employed massive occlusive dressings with sea sponges, or mechanics waste, for graft fixation and compressive obliteration of dead space, with indifferent to poor results. Beginning four years ago, we began to employ routinely a combination of continuous suction, stent fixation of the graft, and very light dressings over all.

A single T-tube of medium size with many accessory openings cut in the transverse arms is inserted through a small stab wound in the lateral flap and adjusted to lie in the gutter along the latissimus dorsi muscle margin and beneath the axillary vessels. The T-tube is sutured to the lateral skin flap to avoid displacement (fig. 1, 2, and 3). Irrigations with saline solution to remove clots and debris are done at once. Complete suction evacuation is carried out, and the flaps and graft are observed to be sucked down flat to the underlying chest wall all around. Suction is continued while the rest of the dressing is carried out. A pad is fashioned of scarlet red gauze and mechanics waste and held in place on the graft by tying together over it the long ends of the flap fixation sutures previously described, in the

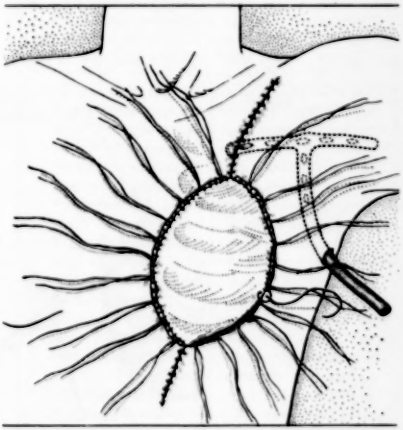


Fig. 2.—Flaps sutured without tension to chest wall and graft applied. Note long ends of sutures preserved for tying over stent.

manner of a stent dressing (fig. 4). The remainder of the mastectomy area is very lightly and very loosely covered with sterile fluffed gauze.

The patient is lifted from the operating table to a stretcher on which a commercially manufactured breast binder with adjustable straps has been placed. The binder is quickly adjusted so that the nonad-

herent, nonocclusive dressing is held gently in place. Utmost care is taken to avoid any compression (fig. 5). Difficult, awkward, and shocking manipulations in the dressing technique are thus avoided. The immediate advantages of ease and speed of

Fig. 3.—Patient at termination of mastectomy. Note healthy appearance of grafts and flaps. T-tube is brought out of axillary limb of incision.

dressing and avoidance of manipulation of a patient who is potentially in shock at the end of a long arduous operation are strikingly apparent.

Continuous suction, applied to the T-tube, by use of an electric pump with a regulating device preventing extremes of negative pressure, is begun

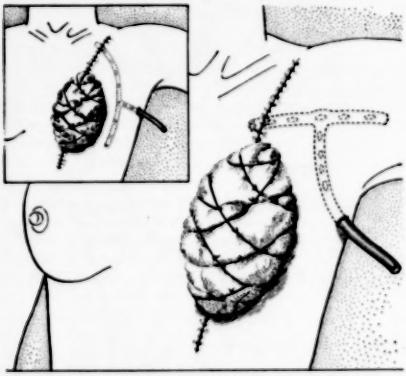


Fig. 4.—Stent applied and tied in place. Insert shows alternate position of T-tube.

in the recovery room and maintained during the first three or four postoperative days. Contrary to usual procedures, the loose over-all gauze dressings are changed at least once daily, more often if necessary, to avoid matting and crusting by blood and serum escaping around the T-tube or between sutures. Fluid accumulations, if any, are evacuated by shifting the T-tube and gently "milking" the flaps, or by direct syringe and needle aspiration. The condition of the flaps is noted so that any strangulating sutures can be released. The stent dressing fixing the skin graft is, of course, left undisturbed for five days, when it is changed.

This routine of frequent easy dressing change adds greatly to the comfort of the patient. Patients can be allowed out of bed, with the suction tube clamped for short intervals, as early as desired. It would be quite logical to dispense with any dressing of the flaps, save perhaps thin strips of grease gauze over the suture lines and, of course, the stent over the graft, were it not for possible irritation by bed clothes and for the esthetic and psychological benefits of concealment of the mastectomy area from the view of the sensitive patient.

Fig. 5.—Binder in place. Every effort is made to avoid pressure by binder.

## Results

Since adopting the above dressing routine for all simple and radical mastectomies, we have been greatly pleased with the improved general condition and comfort of the patients, with the vast improvement in the preservation of viability, and with the healing of the skin flaps. A complete take of the skin graft is usual. Large areas of flap necrosis are no longer seen. Only marginal necrosis of flap edges of minimal extent occurs occasionally. Secondary grafting procedures have not been necessary.

## Summary

The technique of mastectomy dressing, with continuous suction and a commercial breast binder, and avoiding occlusive pressure dressings offers advantages in ease of handling, increased patient comfort, and greatly improved protection and preservation of precariously viable thin skin flaps.

332 W. Broadway (2) (Dr. Sanders).

The breast binder used in this study is obtainable from the Texal Company, 510 First Ave. N., Minneapolis 3.

### References

1. Murphey, D. R., Jr.: Use of Atmospheric Pressure in Obliterating Axillary Dead Space Following Radical Mastectomy, South. Surgeon **13**:372-375 (June) 1947.

2. Raffl, A. B.: Use of Negative Pressure Under Skin Flaps After Radical Mastectomy, Ann. Surg. **136**:1048 (Dec.) 1952.

3. Silvis, R. S.; Potter, L. E.; Robinson, D. W.; and Hughes, W. F.: Use of Continuous Suction Negative Pressure Instead of Pressure Dressing, Ann. Surg. **142**:252-256 (Aug.) 1955.

# HEXAFLUORODIETHYL ETHER (INDOKLON)—AN INHALANT CONVULSANT

## ITS USE IN PSYCHIATRIC TREATMENT

**John C. Krantz Jr., Ph.D., Baltimore, Augusto Esquibel, M.D., Catonsville, Md., Edward B. Truitt Jr., Ph.D., Alfred S. C. Ling, M.S., Baltimore and Albert A. Kurland, M.D., Catonsville, Md.**

*Seventy-five patients received 288 convulsive therapy treatments. A standard course of 12 treatments spaced at 3 treatments a week was given to all patients receiving some form of convulsive therapy in order to obtain comparative information. The type of convulsive therapy to be administered was determined on a random basis in order to obtain a comparative series. Alternate patients were given either hexafluorodiethyl ether as an inhalant or electroconvulsive therapy. It was repeatedly observed in the majority of patients upon whom the inhalant was employed that in the initial phases of their treatment the anesthetic-like vapor seemed less threatening than the concept of an electric current passing through their brain. It was also observed that as the patients improved they seemed to feel somewhat more apprehensive about the relatively slow onset of the effect of the inhalant in contrast to electric shock. The untoward effects observed appeared to be similar to those frequently encountered after electroconvulsive therapy but symptoms cleared in a very short time. While the mechanism by which the convulsive seizure is brought about is unknown at this time, hexafluorodiethyl ether produced the same results therapeutically as did electroconvulsive therapy.*

The introduction in 1935 by von Meduna [1] of the use of artificially induced convulsions to treat schizophrenic reactions initiated much research on the convulsion as a form of therapy. The first agents used by von Meduna [1] were injections of camphor. This was replaced by pentylenetetrazol (Metrazol). Each of these agents had certain disadvantages that led to the search for pharmacoconvulsive agents that were less traumatic psychologically and physically to the patient. Cerletti and Bini [2] had introduced electroconvulsive therapy in 1938. Although pharmacological agents that would elicit a convulsion were introduced from time to time, none could compete with the electroconvulsive technique. Many modifications were developed in the application of electric currents with the aim of diminishing such complications as fractures and transient states of confusion and memory loss. However, according to Kalinowsky and Hoch [3] in their monograph on somatic treatments in psychiatry, "these have added little to the previous work with electroconvulsive therapy." The recent synthesis of the compound hexafluorodiethyl ether (Indoklon), the convulsant action of which was an unexpected observation, indicated the possibility that a pharmacoconvulsive agent was now available with few of the disadvantages of the drugs previously employed.

### Pharmacology

The synthesis of hexafluorodiethyl ether stemmed from a series of investigations dealing with the anesthetic action of aliphatic fluorinated ethers of low molecular weight.[4] Hexafluorodiethyl ether ($CF_3CH_2$-O-$CH_2CF_3$) was observed to elicit vio-

Professor of Pharmacology, University of Maryland School of Medicine (Dr. Krantz); Senior Psychiatrist, Spring Grove State Hospital (Dr. Esquibel); Associate Professor of Pharmacology, University of Maryland School of Medicine (Dr. Truitt); Graduate Student, Department of Pharmacology, University of Maryland School of Medicine (Mr. Ling); and Director of Medical Research, Spring Grove State Hospital (Dr. Kurland).

lent convulsions upon inhalation in many species of laboratory animals. This compound is a colorless, mobile liquid which is readily volatile and emits a mild and pleasantly ethereal odor. The boiling point is 63.9 C, and the specific gravity is 1.41 (20/4). The compound is very insoluble in water but soluble in alcohol. The vapor is noninflammable.

White rats exposed to the vapor of hexafluorodiethyl ether in a concentration as low as 30 ppm W/V had violent convulsions within 30 seconds. The convulsions ceased when the agent was removed from the inspired air. Repeated exposures on subsequent days did not appear to produce injury to the animals. Blood studies and histological examination of the lungs, liver, spleen, brain, heart, kidneys, adrenals, and bone marrow revealed no drug-induced toxic effects. When hexafluorodiethyl ether was administered intravenously to dogs in doses of 7 mg. per kilogram, a convulsive syndrome ensued within a minute and prevailed for 10 minutes. The animals recovered and after 24 hours showed no gross ill-effects from the injection. Hexafluorodiethyl ether was no more irritating than ethyl ether on the mucous membrane of the rabbit.[5]

Hexafluorodiethyl ether did not produce hypoglycemia in the rabbit. This agent did not inactivate cholinesterase in vitro, which suggests that the convulsive seizure is not mediated through an excess of acetylcholine. This factor is important in the application of muscle relaxant drugs that are related to acetylcholine. In electroencephalographic studies with dogs and monkeys under thiopental (Pentothal) sodium anesthesia, the inhalation of hexafluorodiethyl ether produced a marked cortical dysrhythmia. The multiple spike and 3-to-4 cps slow wave discharge which first occurs was soon followed by high-voltage multiple spiking similar to that elicited by convulsion following administration of pentylenetetrazol.

Krantz and co-workers [5] suggested that, owing to the apparently harmless nature of repeated exposures to hexafluorodiethyl ether vapor in animals, the rapid onset of the seizures, and the ease of control of depth and duration of the seizures, this compound might be found useful in the treatment of certain types of mentally ill patients. Accordingly, four patients who were suffering depressive reactions for which electroconvulsive therapy was indicated were each subjected to one treatment with hexafluorodiethyl ether administered by inhalation from a common plastic nasal inhaler. These four patients showed no untoward reaction to this one exposure.[5a] As a result of these clinical trials, we decided to conduct a full-scale clinical investigation with hexafluorodiethyl ether.

## Method

*Selection of Patients.*—The patients were selected for convulsive treatment by the patients' hospital physicians. The type of convulsive therapy to be administered was determined on a random basis in order to obtain a comparative series. Alternate patients were given either hexafluorodiethyl ether or electroconvulsive therapy. The patients selected for either treatment were those recently admitted to the hospital with a mental disorder in which a severe depression was the outstanding characteristic. Patients were also selected with acute or chronic schizophrenic reactions who had previously been subjected to a variety of treatment procedures with no improvement. These patients had become management problems, and convulsive therapy was indicated for a symptomatic improvement. All drug therapy was discontinued at least three days prior to treatment.

*Laboratory Data.*—Preparatory to the administration of hexafluorodiethyl ether, routine blood studies, including cephalin-flocculation and thymol-turbidity tests for liver function, were done. Routine urine examinations were conducted. These were carried out at weekly intervals during the course of therapy. In addition, a series of serial electrocardiograms were carried out on most of these patients before, during, and after each treatment. Routine x-ray studies of the chest were obtained on all patients prior to treatment. Electroencephalograms were obtained before and after treatment on many of these patients. Also, a series of psychological studies consisting of the Wechsler memory scale, forms 1 and 2, and the Graham Kendall test were administered prior to, immediately after, and three weeks after treatment to determine the degree of intellectual impairment resulting from the treatment. In addition, Lorr scale ratings (multiple scale for rating psychiatric patients) were obtained at the same intervals to obtain quantitative measures of changes in the symptomatic manifestations of the patients' mental disturbance.

*Treatment Procedures.*—A standard course of 12 treatments spaced at 3 treatments a week was given to all patients receiving some form of convulsive therapy in order to obtain comparative information. Occasionally there were patients in whom for various reasons therapy was stopped prior to this number of treatments, and there were also patients who received additional treatments.

While the treatment procedure was being carried out, and for several weeks after the termination of the treatment, the patients were interviewed at frequent intervals so that their subjective impressions of this treatment and an objective evaluation of their responses could be obtained. Many of these patients had received previous courses of electroconvulsive therapy and were able to offer compari-

sons. However, the final evaluation of the patients' reaction to the treatment procedure was determined on the basis of the ward physicians' opinion.

*Technique for Administration of Inhalant Convulsant.*—The patients were prepared for hexafluorodiethyl ether therapy by a procedure similar to that followed for electroconvulsive therapy. After fasting, patients were given 0.6 mg. of atropine sulfate parenterally prior to treatment. In the first clinical trials inhalers similar to those used for the common nasal decongestant, with amounts of up to 6 cc. of the drug, were used. When these plastic inhalers were used they were merely inserted into one nostril and the other closed. The patients were not anesthetized. Later, a double-barreled plastic inhaler was used for both nostrils. However, this method was not satisfactory because of the difficulty in holding the inhaler manually and at the same time keeping the patient's mouth closed. There was also the added factor of pressure to the nostrils since the inhaler had to be held quite firmly. To obviate this awkwardness, a Stephenson mask modified appropriately with an activated charcoal exhalant adsorber was used (see figure). Originally there was fear that the leakage of the vapor might affect the personnel giving the treatment, but with a well-ventilated room there were no untoward reactions in these personnel.

The mask is close-fitting with a one-way flow with the drug dispersed in a measured amount over absorbent gauze contained in a plastic reservoir with air inlets. This is fastened into the inlet valve of the mask. The patient inhales a mixture of vapor and air. The expired vapor is forced through another one-way valve into a carbon adsorbent.

The patient breathes oxygen for about 30 seconds, a rubber mouth gag is inserted, the mask is strapped on, and the hexafluorodiethyl ether reservoir is shunted into the path of the respired air. (It was our impression that some preliminary breathing of oxygen by the patient seemed to bring about a smoother course.) The drug vapor is then turned on.

With experience it was found that, after the initial loading of the reservoir with the gauze saturated with approximately 1.5 cc. of hexafluorodiethyl ether, each subsequent treatment or convulsion could be achieved by resaturating with approximately 0.5 cc. of hexafluorodiethyl ether. Further developments in this technique are in progress to provide a multiple treatment reservoir which may ultimately be disposed of without necessitating the refilling procedure.

The onset of the convulsion could be accelerated or delayed by regulating the amount of air entering the system via the bypass air inlet valve. Experiences indicated that an induction period of up to 20 seconds is optimal. Longer periods created anxiety in the patients as they awaited the onset of unconsciousness evoked by the inhalation of the drug.

*Convulsive Pattern.*—As each patient was treated, the convulsive pattern was studied according to the following plan. The onset and the course of the subsequent phases, namely, the myoclonic, tonic, and clonic phases, the onset of respiration, and the total time for recovery, were timed. The onset of the convulsion was measured from the time of insertion of the reservoir containing the drug in the mask to the first observable myoclonic jerks which invariably preceded the onset of the tonic spasm. As the amount of drug placed into the reservoir decreased, there was a gradual lengthening of the period of onset.

Modified Stephenson mask in place on patient.

The onset of the convulsion was preceded by unconsciousness. The seizure was initiated by a series of myoclonic movements lasting on the average about two to five seconds. This phase of activity may prevent the sudden muscular contractions and "jackknifing" which are thought by many to produce the fractures associated with convulsive therapy. It appears that this type of onset more closely approaches that of the epileptic, who seldom develops fractures.

The tonic phase was measured from the end of the myoclonic jerks to a point at which the force of the clonic movements seems to overcome the force exerted by the extensor muscles in tonus. The end of this period usually occurs just prior to the termination of the opisthotonic arching of the back. This period usually lasts from 15 to 30 seconds. The clonic phase was measured from the end of the tonic phase to the end of the clonic movements. The duration of this period ranged from 15 to 35 seconds.

The respiratory recovery was measured from its onset in relation to the termination of the clonic phase. The time of respiratory recovery was between 15 seconds before and 5 seconds after the termination of the clonic phase. In most cases the onset of respiration occurred before the termination of the clonic phase.

The period of total recovery was measured from the time of the insertion of the reservoir containing the drug to the point at which the patient responded by opening his eyes when called. This period ranged from 2 to 15 minutes. Occasionally there were patients who exhibited myoclonic activity after the termination of the initial convulsion. Rarely, there was a transient second convulsion after the termination of the first. This is attributed to excessive medication with hexafluorodiethyl ether. There were two such episodes in a total of 288 treatments.

*Results of Treatment.*—As shown in the table, the results of treatment were recorded as recovery, great improvement, improvement, no change, and worse. Recovery was defined as indicating social recovery, with the patient ready to take his place in society again, complete loss of hallucinations and delusions, return of affect, and disappearance of abnormal behavior. Great improvement signified one or more of the following three changes: (*a*) loss of hallucinations, (*b*) marked improvement in interpersonal relationships, and (*c*) marked improvement in affect. Such patients were given increased hospital liberty and transferred to convalescent wards. Improvement included all the criteria for great improvement except that these improvements were temporary (effect of treatment lasted one month or less). No change referred to only transient improvement during the period of treatment, with the patient at the end of treatment

*Results in Twenty-five Patients Treated with Hexafluorodiethyl Ether (Indoklon)*

| Case No. | Sex | Age, Yr. | Diagnosis | Duration Present Hospitalization | Previous Hospitalization | Reasons for Convulsive Therapy | No. of Treatments | Results* |
|---|---|---|---|---|---|---|---|---|
| 1 | F | 32 | Schizophrenic reaction, chronic, paranoid, and catatonic features | 2 yr. | No | Increasingly disturbed, excited, agitated, assaultive, destructive; required seclusion; failed to respond to other therapies | 9 | + |
| | | | | | | Repeated catatonic-like excitement at time of menstruation† | 2 | + |
| 2 | F | 32 | Schizophrenic reaction, chronic, catatonic, paranoid, and hebephrenic features | 3 yr. | No | Regression to isolative, withdrawn, hallucinated, incoherent state with failure to maintain sustained improvement with other therapies tried | 15 | + |
| | | | | | | Regression to withdrawn, seclusive state with refusal to eat† | 2 | + |
| 3 | F | 45 | Psychotic depression | 9 mo. | Yes | Increasing depression with suicidal preoccupations, marked feeling of unworthiness, periods of agitation and confusion | 10 | +++ |
| 4 | F | 29 | Schizophrenic reaction, catatonic type | 2 mo. | Yes | Marked restlessness, agitation, confusion; overactive and excited; required seclusion | 12 | +++ |
| 5 | F | 32 | Schizophrenic reaction, chronic, catatonic type | 2 mo. | Yes | Preoccupied, withdrawn, ritualistic, hallucinated; was becoming a feeding problem | 12 | +++ |
| 6 | F | 32 | Psychotic depressive reaction | 2 mo. | No | Numerous physical complaints, crying spells, increasing depression, increasing agitation; inability to take care of self | 6 | +++ |
| 7 | M | 35 | Schizophrenic reaction, chronic paranoid type, associated with episode of catatonic stupor | 1 yr. | Yes | Mute, confused, disoriented, delusional, and in catatonic stupor | 12 | ++ |
| 8 | M | 27 | Schizophrenic reaction, paranoid type, with depressive features | 2 mo. | No | Delusional, hallucinating, paranoid, panicky, agitated; episodes of crying and screaming | 17 | + |
| 9 | M | 24 | Schizophrenic reaction, catatonic type | 1 yr. | Yes | Mute, hallucinated, negativistic, restless | 12 | +++ |
| 10 | M | 53 | Involutional psychotic reaction | 2 mo. | Yes | Depression, hypochondriasis, insomnia; inability to take care of self | 12 | 0 |
| 11 | F | 46 | Depressive reaction (lobotomized 1949) | 9 mo. | Yes | Depressed, tense, unable to work | 12 | +++ |
| 12 | M | 26 | Schizophrenic reaction, catatonic type | 2 mo. | Yes | Mute, negativistic, agitated; demonstrated autistic thinking and confusion; unable to take care of self | 12 | +++ |
| 13 | F | 47 | Involutional psychotic reaction | 5 mo. | Yes | Markedly depressed, delusional; intense anxiety and preoccupation | 10 | ++ |
| 14 | M | 34 | Schizophrenic reaction with paranoid and catatonic features | 1 yr. | Yes | Depressed, hallucinated, withdrawn, seclusive, confused | 12 | + |
| 15 | F | 46 | Involutional psychotic reaction | 2 mo. | No | Suicidal tendencies, depressed, not eating, hypochondriacal | 12 | + |
| 16 | F | 46 | Psychotic depressive reaction | 1 yr. | No | Depression | 8 | + |
| 17 | F | 32 | Psychotic depressive reaction | 1 yr. | Yes | Delusional, bizarre ideation with destructive thoughts, leading to fearfulness and depression | 25 | + |
| 18 | F | 49 | Chronic, undifferentiated schizophrenic reaction | 3 mo. | Yes | Depressed, confused, hallucinated, delusional; not eating; considered suicidal | 12 | + |
| 19 | F | 44 | Schizophrenic reaction, paranoid | 3 mo. | Yes | Demonstrating autistic behavior, hallucinated, confused, destructive, suicidal | 12 | ++ |
| 20 | F | 37 | Schizophrenic reaction, chronic, paranoid | 5 mo. | Yes | Tense, apprehensive, depressed, neglectful of self, delusional, considered suicidal | 9 | +++ |
| 21 | M | 34 | Schizophrenic reaction, chronic, paranoid | 3 mo. | Yes | Confused, preoccupied, hallucinated, delusional | 9 | +++ |
| 22 | F | 26 | Acute schizophrenic reaction with paranoid features | 3 mo. | No | Hallucinated, delusional, confused, agitated, suicidal | 12 | + |
| 23 | F | 32 | Schizophrenic reaction, chronic, undifferentiated type | 2 mo. | No | Delusional, hallucinated, confused, agitated combative, inappropriate affect, overactive; demonstrated unpredictable impulsive behavior | 12 | ++ |
| 24 | F | 35 | Schizophrenic reaction, paranoid | 1 mo. | Yes | Delusional, hallucinated; inappropriate affect, impulsive acting out | 10 | ++ |
| 25 | F | 65 | Schizophrenic reaction, schizoaffective type | 1 mo. | Yes | Depressed, confused, phobic; had increasing agitation and feelings of unreality | 12 | + |

* +++ = recovery, ++ = great improvement, + = improvement, 0 = no change, and W = worse. † Second course, three months later.

considered to have shown no change from his original symptoms. Worse indicated that the state of regression or disturbed state seemed to be further intensified by the treatment procedure.

## Clinical Experiences

The unusual properties of this volatile inhalant, hexafluorodiethyl ether, namely, its evoking unconsciousness and convulsant actions without apparent residual toxic effects, appeared to be admirably suited for convulsive therapy. Especially significant were its gradual onset of action and its automatic self-regulating mechanism. This occurred as its concentration reached the convulsive threshold, with the patient involuntarily ceasing to breathe with the onset of the tonic phase, thus preventing the possibility of overdosage.

It was repeatedly observed in the great majority of patients that in the initial phases of their treatment the anesthetic-like vapor seemed less threatening to the patients than the concept of an electric current passing through their brain. It was also observed that as the patients improved they seemed to feel somewhat more uncomfortable about the relatively slow onset of the effect of the inhalant in contrast to electric shock. However, at the termination of their treatments, when questioned as to which they preferred, the majority favored the "gas." The initial sampling of the results of this form of convulsive therapy in this preliminary study consisted of 25 patients who received a total of 288 treatments. The results are indicated in the table.

From a study of the table it will be observed that 9 patients (cases 3, 4, 5, 6, 9, 11, 12, 20, and 21) out of these 25 had a sufficient degree of improvement to be released from the hospital, having made a good social recovery within one to eight weeks after the termination of the hexafluorodiethyl ether treatments. The following abstracts of cases 3, 4, 5, and 11 were selected as representative examples of this group of responses.

## Report of Cases

CASE 3 (psychotic depression).—A 40-year-old married female was admitted in July, 1956, because of agitation, confusion, periods of disturbed behavior, depression associated with feelings of self-depreciation and unworthiness, and an inability to work or look after her family. Her history indicated the onset of her depression a year previously, after the birth of her third child. She was hospitalized, receiving a course of 30 electroconvulsive treatments, with some improvement. Several months later she became depressed again, and after her hospitalization, despite supportive treatment, her status remained unchanged. In December, 1956, the patient was placed on a course of hexafluorodiethyl ether therapy, receiving a total of 11 treatments. She responded well, her depression lifting after the third treatment. In February, she was described as making an excellent ward adjustment, working in the hospital beauty shop, socializing with other patients, and writing letters.

When the patient was questioned about her treatments after their completion, she stated she was more frightened toward the end of the "gas" treatments because they were not as instantaneous as electric shock. She also had a feeling of not being able to breathe before she lost consciousness. However, when she was confronted with the issue of making a decision as to what kind of treatment she would prefer if she had to receive treatment again, after some thought, because of her aversion toward having either type of treatment, she felt that she would take the gas because "it was less damaging to her brain than electricity." In April, 1957, the patient was released from the hospital, and she is being seen in the outpatient clinic for psychotherapy. She continues to do well.

CASE 4 (schizophrenic reaction, acute catatonic excitement).—A 29-year-old married female was admitted January, 1957, in a state of acute excitement. She was disoriented, agitated, restless, emotionally labile, manneristic, ritualistic, and at times very fearful. The history revealed the patient to have had exactly the same symptoms one year previous when she was admitted for the first time to this hospital. At that time she received 15 electroconvulsive treatments. After the third treatment she began to improve, and she was subsequently discharged.

In February, 1957, the patient was started on hexafluorodiethyl ether therapy, receiving 12 treatments. After her third treatment she began to display signs of improvement. She was rational, cooperative, well-oriented, cheerful, and pleasant, and she participated in ward activities.

When the patient was asked to compare experiences with both forms of convulsive therapy she revealed that she preferred the hexafluorodiethyl ether to electroconvulsive therapy but found the ethereal odor somewhat objectionable. She said that after electroconvulsive therapy she felt as if her "head was fried for two hours." She also remembered having severe headaches after the electroconvulsive therapy. Within 10 minutes after her recovery from the hexafluorodiethyl ether treatment and on her return to the ward, she could begin her routine activities. At no time was there any complaint of confusion and memory loss. She was discharged in March, 1957.

CASE 5 (schizophrenic reaction, paranoid type, chronic).—A 31-year-old female, married but separated, was admitted in January, 1957. At this time she manifested auditory and visual hallucinations, posturing and ritualistic movements, flattened affect, and fragmented thinking; she was incapable of self-care and was not eating. Her history revealed a previous admission to the Spring Grove State Hospital in May, 1953, with a similar diagnosis. At that time no active therapy was undertaken because of uncertainty concerning possible pulmonary tuberculosis. Diagnostic studies were negative. She was placed on reserpine therapy for several weeks, and there was a gradual remission of her symptoms. The patient was released in August, 1955.

During her present admission she received 12 hexafluorodiethyl ether treatments, making a gradual recovery. Her feelings about these treatments were: "I remember smelling and that's all. I can't say anything against them—I'm not afraid of them." There were no complaints made referable to memory or feelings of confusion. She was released from the hospital in March, 1957. She was seen several weeks later in an interview and was doing well.

CASE 11 (depressive reaction, with previous lobotomy).—A 46-year-old female, married but separated, was admitted in July, 1956. She complained of being depressed and unable to enjoy life and of a squeezing sensation in her throat, with an inability to function and look after herself. The history revealed that the patient had a supraorbital lobotomy in 1949 for a similar complaint, without any feeling of relief. A few months prior to the present admission, because of her dysphoric feelings, the patient had a series of 12 electroconvulsive treatments, with no improvement. During the months of her present hospitalization the patient appeared to be a masochistic, frustrated individual, who had great feelings of inadequacy. Despite

the fact that the patient was being treated with chlorpromazine, she still complained at times of very strong suicidal tendencies, making only a marginal adjustment to hospital routines. She was seen in individual psychotherapy for several months, and various medicaments and combinations were tried in an attempt to relieve her persistent depression, but she continued to remain tense and depressed. In March, 1957, she received a total of 12 hexafluorodiethyl ether treatments, with a marked alleviation of her depression. In fact, the patient behaved in a rather irresponsible, euphoric manner. Gradually this behavior subsided, and the patient maintained her improvement.

In discussing her feelings about the hexafluorodiethyl ether treatments she stated, "These treatments are less disturbing than the regular electric shock treatments. It doesn't disturb my mind the way the others did. It doesn't affect my memory as much." She did not feel as confused with the gas treatments as she had felt with the electric shock. Near the end of her treatments she expressed a feeling that the electric shock treatments were not as hard on her as the gas because the electric shock put her out faster. When confronted with a choice, she could not make a decision in favor of either one. In May, 1957, she felt well enough to request leaving the hospital and was discharged.

**There were five patients (cases 7, 13, 19, 23, and 24) who displayed a great deal of improvement but were not considered well enough to leave the hospital. Clinical examples of such cases are indicated in the following abstracts of the patients in cases 7 and 13.**

Case 7 (schizophrenic reaction, chronic, paranoid type).—A 34-year-old married male was admitted in December, 1956, in a state of catatonic stupor. He expressed ideas of persecution and of being "framed" by friends, had bizarre concepts about himself such as that he had two heads, became emotional, with crying and reading of the Bible, and, finally, precipitated his hospitalization by drinking rubbing alcohol in a suicide attempt. His history indicated that he was well until July, 1955, when he began to talk "nonsense" loudly to his wife and became frightened on the street. Over the months he became progressively more suspicious of people and accused his wife of infidelity, demanding to know her whereabouts at all times; he became unable to hold a job, and took to sitting and brooding at home. He accused his 12-year-old daughter and wife of trying to "poison his coffee" and "dope his cigarettes."

The patient was given 12 hexafluorodiethyl ether treatments in March, 1957. His state of catatonic stupor and intense preoccupation was resolved. However, at times, he would be observed talking to himself and cleaning the ward in a very obsessive manner. He still appeared to be confused at times and was somewhat inhibited in his ability to communicate, but he had a fair contact with reality, had improved sufficiently to obtain ground privileges, and was working in the occupational therapy section.

Concerning his thoughts about his treatment, he attributed his improvement to the treatments which he was receiving. When questioned as to what they were, he replied that he was being given gas and "gas is doing something to the weed-killing stuff in me." He continued in this autistic manner, stating "it is given to me by a man in the apartment—gave it to me in a cup of coffee" (laughed) "it kind of takes my breath away but it doesn't scare me." The patient remains in the hospital at present and is maintaining a good adjustment.

Case 13 (involutional psychotic reaction).—A 46-year-old widowed female was admitted in January, 1957, because of increasing depression, paranoid delusions, and sexual preoccupations that were delusional in character. Her history revealed that the patient was hospitalized in 1955 and treated with electroconvulsive therapy and psychotherapy.

She was given 10 hexafluorodiethyl ether treatments in March, 1957, with a resolution of her paranoid trends, but she still remained somewhat depressed, suspicious, and confused. In May, 1957, she continued to improve, was going home occasionally for a week end, and was making a good hospital adjustment. She was more cheerful and active and described herself as feeling better and more relaxed. When questioned concerning her treatments, she replied, "I breathe and go to sleep—I do not know what happens. I feel that I did not like it at first and still don't like the effects of its putting me to sleep—the rushing of things all together as I breathe it. I have a funny feeling in my head. It all goes together and then just quits—that's the end of it." She could not remember previous experiences with electroconvulsive therapy. She was not frightened of the present treatments but felt she might have been of the electroconvulsive therapy, which, however, she could not remember too well. The patient remains in the hospital at the time of writing.

**There were 10 patients (cases 1, 2, 8, 14, 15, 16, 17, 18, 22, and 25) who displayed only a transient improvement and relapsed after treatment stopped. Two samples of such cases follow.**

Case 1 (schizophrenic reaction, chronic, paranoid, and catatonic features).—A 33-year-old married female was admitted to this hospital 15 months prior to the time of writing. On admission she was disturbed, excited, agitated, assaultive, and destructive, requiring seclusion, and was a difficult management problem. Her history revealed no record of previous difficulties until she was admitted to this hospital three weeks after the birth of her first child. At that time she had become depressed, hallucinated (auditory), extremely suspicious, had had persecutory ideation, and had engaged in fragmented thinking and irrational behavior. During her course in the hospital she was first treated with chlorpromazine with no particular results. She was then given a course of electroconvulsive therapy with only transient improvement. She was then treated with reserpine with no apparent effect. Subsequently she received 50 treatments of insulin coma. This was later combined with electroconvulsive therapy, but after her 50th shock treatment the patient developed compression fractures of the fifth, sixth, and seventh thoracic vertebrae, and the electroconvulsive therapy was discontinued. There appeared to be no particular response to this treatment, and the patient ran a fluctuating course in which she would become disturbed, requiring seclusion and cold wet packs. At one point she was placed on a trial of estrogen therapy for a period of three months because it was noted that the patient became extremely disturbed for three days to a week after the onset of her menstruation. This therapy was discontinued because the patient showed no improvement.

In the 15th month of her hospitalization she was given a course of hexafluorodiethyl ether therapy, receiving a total of nine treatments. She displayed marked improvement, but it lasted only a few weeks. During this period of improvement she participated in ward activities, was accessible, expressed desires to go home, and seemed more relaxed and comfortable. The patient stated that she preferred this treatment (hexafluorodiethyl ether) to electroconvulsive therapy, which she dreaded. She felt that she did not have as much confusion or trouble with her memory as she had had with electroconvulsive therapy.

Three months after her course of treatment there again occurred regression, and, with the onset of her menstrual period, she had an episode of catatonic-like excitement. She was given another course of hexafluorodiethyl ether

consisting of two treatments, and had a prompt but transient improvement. At the time of writing she remains in the hospital and is receiving large doses of an ataractic drug (Chlorpromazine) that is having a moderate effect.

CASE 2 (schizophrenic reaction, chronic, catatonic, paranoid, and hebephrenic features).—A 32-year-old married female with four children has been hospitalized continuously at this hospital for 38 months prior to the time of writing. Just prior to the present treatment with hexafluorodiethyl ether she was isolative, withdrawn, apathetic, and hallucinating, with incoherent verbal productions. She was being considered for another trial with electroconvulsive treatment when this experimental treatment was proposed. The history revealed that after a miscarriage in June, 1953, she was admitted to this hospital because she became depressed, withdrawn, suspicious, developed ideas of persecution, and had auditory and visual hallucinations. During her three years of hospitalization she has had repeated courses of electroconvulsive therapy, with very little improvement. In August, 1954, she had a complete course of deep-coma insulin treatments without noticeable effect. For a brief time in the early part of 1955 she showed a slight improvement, then regressed. A subsequent course of chlorpromazine and azacyclonol (Frenquel) hydrochloride was without appreciable effect.

In December, 1956, she was started on hexafluorodiethyl ether therapy, receiving 15 treatments. While this patient displayed a great deal of anxiety when exposed to any type of treatment, she cooperated readily. Her hospital physician, who administered her previous courses of electroconvulsive therapy, seemed to feel that she had a more comfortable experience with hexafluorodiethyl ether. During her period of transient improvement she began to socialize with other patients, became interested in her appearance, and helped with the ward work. Her conversations became normal. She slept well, and her appetite was better. However, as treatment continued, she seemed to reach a plateau and showed no further improvement.

When interviewed concerning her "gas" treatments she stated that she was not as much afraid of them as of electric shock treatments. However, as her treatments continued, she became increasingly resistant to them. Two months after the termination of her treatments she again regressed, became seclusive, withdrawn, and preoccupied, stopped eating, and became a management problem. She was given a course of two hexafluorodiethyl ether treatments with a marked but transient improvement. She remains in the hospital at time of writing.

There was only one patient (case 10) who displayed no change during treatment. There were apparently no cases that were worsened by this treatment. Case 10 (below) was that of a patient with an involutional psychotic reaction. It was an interesting observation in this study that there were only three cases classified as involutional psychotic reactions, and in each case such patients had received intensive treatment before coming to this hospital. They had not responded to treatment, and, upon exposure to another course of treatment, there were none who showed sufficient recovery to be discharged from the hospital within the six-month period of this study.

CASE 10 (involutional psychotic reaction).—A 53-year-old married male was admitted in January, 1957, because of depression and somatic complaints. His history indicated that he had been hospitalized a few months previously, receiving a series of electroconvulsive treatments for a similar reaction. The patient received a course of 12 hexafluorodiethyl ether treatments in March, 1957. At times he seemed to show some improvement in that his hypochondriacal preoccupations were not as intense. He slept better and associated freely with the other patients. However, this improvement only persisted for a brief interval after one treatment. As treatment progressed he expressed increasing anxiety and seemed confused. By the end of treatment little difference could be seen from his state prior to the onset of treatment. He has remained in the hospital, and is making a marginal adjustment. The patient could not express any clear feelings about his treatment and was under the impression that he was getting electric shock treatments.

In this initial study there appeared to be no evidence of any toxicity developing, as indicated by routine blood and urine studies. Liver-function studies (thymol-turbidity and cephalin-flocculation tests) showed no significant change. The electrocardiograms were essentially unchanged. The question of what might occur if hexafluorodiethyl ether is combined with the administration of such drugs as succinylcholine chloride and thiopental (Pentothal) sodium as yet remains to be determined. The few initial electroencephalographic studies that were available, of the patients before and after treatment, seemed to indicate that the high-voltage slow waves did not persist to the degree which is usually seen after electroconvulsive therapy.

The untoward effects observed appeared to be similar to those frequently encountered after electroconvulsive therapy. Some of the patients complained of one or more symptoms such as occasional headache, nausea, and dizziness, which occurred immediately after convulsion. These symptoms cleared in a very short time. Postictal confusion, amnesia, and psychomotor activity appeared to be less than with electroconvulsive therapy. There was one vertebral compression fracture in 288 treatments. The patient complained of severe backache, and x-ray examination indicated a fracture in the thoracic vertebrae.

As some patients who had received courses of electroconvulsive therapy in the past progressed through their treatment, they appeared to develop some anxiety that was related to the delay of onset in contrast to the immediate action of electroconvulsive therapy. These delays resulted often, due to the experimentation that was being conducted in the regulation of the air and vapor mixture. Convulsions could not be elicited in less than 10 seconds.

The physicians giving the treatments admitted the advantage of the immediate action of electroconvulsive therapy, but felt that this was more than compensated for by the convulsant inhalant for the following reasons. First, the onset of the convulsion was gradual, without the "jackknifing" effect that is frequently seen at the onset of electroconvulsive therapy and that is suspected of producing many of the compression fractures occurring in such therapy. Secondly, the period of apnea appeared shorter, and there appeared to be less

cyanosis occurring. Subjectively, the majority of the patients seemed less fearful of this form of treatment in contrast to electroconvulsive therapy, despite the anxiety occasioned by the delayed onset.

No attempt was made to obtain percentage evaluations relating to the degree of response of the patients in the different diagnostic categories, since we felt that the sample was too small. We observed, however, that, in a comparable group of 25 patients who were receiving electroconvulsive therapy during the period of this initial study, 9 of the patients receiving hexafluorodiethyl ether and only 5 of those receiving electroshock therapy had been released from the hospital. Whether this trend is significant will be seen when this study is extended.

## Comment

The mechanism by which the convulsive seizure is brought about is unknown at this time. Studies are being conducted comparing a series of patients receiving hexafluorodiethyl ether with those receiving electroconvulsive therapy. These studies are being evaluated on the basis of the patient's clinical response and complications. Psychological studies are being conducted for comparative evaluation of intellectual impairment following the two types of treatment and of their effect on memory function. Electroencephalographic and electrocardiographic studies and transaminase determinations are also being obtained on a comparative basis. Another area in which studies are planned is that of the relationship between hexafluorodiethyl ether and such muscle relaxants as succinylcholine. The use of tranquilizing drugs with this treatment procedure is also an area requiring investigation. The alternate use of hexafluorodiethyl ether and electroconvulsive therapy offers interesting possibilities. If a patient develops increasing resistance to one form of therapy he may be changed to the other. The question whether this alternation will bring about an increased therapeutic effect compared to the use of either one alone is being further explored.

## Summary

Hexafluorodiethyl ether (Indoklon), administered to 25 hospitalized psychiatric patients requiring convulsive therapy, never failed to produce a convulsive seizure. It produced the same results therapeutically as electroconvulsive therapy with apparently less apprehension and less postconvulsive confusion on the part of the patients. A three-month follow-up of this group of 25 patients compared favorably to that of a similar group of patients receiving electroconvulsive therapy.

## Addendum

Since submitting this manuscript we have administered more than 1,000 treatments with hexafluorodiethyl ether to about 80 patients. Our general impressions have remained unchanged.

29 S. Greene St. (1) (Dr. Krantz).

The hexafluorodiethyl ether used in this study was supplied as Indoklon by the Ohio Chemical & Surgical Equipment Company, Madison, Wis.

This study was supported by grants from the Ohio Chemical & Surgical Equipment Company and the Friends of Psychiatric Research, Inc.

### References

1. Meduna, L. J.: Die Konvulsionstherapie der Schizophrenie, Halle, Germany, Carl Marhold, 1937.

2. Cerletti, U., and Bini, L.: L'Elettroshock, Arch. gen. di neurol. psichiat. e psicoanal. **19**:266, 1938.

3. Kalinowsky, L. B., and Hoch, P. H.: Shock Treatment, Psychosurgery and Other Somatic Treatments in Psychiatry, ed. 2, New York, Grune & Stratton, Inc., 1952.

4. Krantz, J. C., Jr.; Carr, C. J.; Lu, G.; and Bell, F. K.: Anesthesia: XI. Anesthetic Action of Trifluoroethyl Vinyl Ether, J. Pharmacol. & Exper. Therap. **108**:488-495 (Aug.) 1953. Lu, G.; Ling, J. S. L.; and Krantz, J. C., Jr.: Anesthesia: XLI. Anesthetic Properties of Certain Fluorinated Hydrocarbons and Ethers, Anesthesiology **14**:466-472 (Sept.) 1953.

5. (*a*) Krantz, J. C., Jr.; Truitt, E. C., Jr.; Speers, L., and Ling, A. S. C.: New Pharmaco-convulsive Agent, Science **126**:353-354 (Aug. 23) 1957. (*b*) Krantz, J. C., Jr.; Truitt, E. B., Jr.; Ling, A. S. C.; and Speers, L.: Anesthesia: LV. Pharmacologic Response to Hexafluorodiethyl Ether, J. Pharmacol. & Exper. Therap. **121**:362-368 (Nov.) 1957.

---

**ACUTE APPENDICITIS.**—In a recent analysis of the deaths from acute appendicitis in Philadelphia from 1944 to 1953 inclusive, the mortality was reduced from 1 per cent to less than 0.5 per cent. The appendix had ruptured in 67 per cent of the fatal cases. In this study peritonitis was the cause of 56 per cent of the deaths. It was of interest that this figure was about the same for each of the ten years studied and was not lowered in the most recent years even though antibiotics were widely used. The mortality is greatest in patients over 50 years of age or in children under ten years of age. In the older patients, concomitant diseases oftentimes were an important factor in the death; in childhood, disturbances in the electrolyte balance and dehydration were of great significance.—F. A. Bothe, M.D., Appendectomy, *The Surgical Clinics of North America*, December, 1957.

# EPIDEMIC DIARRHEA IN PREMATURE AND OLDER INFANTS CAUSED BY ECHO VIRUS TYPE 18

Heinz F. Eichenwald, M.D., Alexander Ababio, B. A., Albert M. Arky, M.D.
and
Allen P. Hartman, M.D., New York

*Two related outbreaks of diarrhea among infants from whom it was possible to isolate a virus clearly responsible for the illness represent the first proved instances of such etiology. Clinically, the disease was not severe. The diarrhea persisted from one to five days, with a mean duration of three days. The illness was treated by a reduction in caloric content of feedings, supplemented by the parenteral administration of water and electrolytes whenever indicated. After subsidence of the diarrhea, the babies were gradually returned to their normal formulas, without recurrence of disease.*

Despite the ubiquity of diarrheal disease in clinical practice, failure to identify a specific bacterial or parasitic cause is the usual happening. Even in those underdeveloped areas in the world where bacterial diarrheas are highly endemic, no etiological agents can be found in approximately 65% of the cases.[1] It has therefore been generally assumed that a number of viruses may be responsible for a majority of these illnesses.

Impressive, although indirect, evidence does exist that various different, poorly defined viral agents may be a cause of a number of clinical syndromes characterized by diarrhea.[2] With some of these agents, diarrhea has been produced in human volunteers by inhalation [3] or on oral inoculation [4] and some have been passed serially in humans,[4] cats, [4b] calves,[5] and rabbit cornea.[6] Nevertheless, according to Higgins,[7] no complete evidence has yet been adducted in proof of a viral agent in diarrheal disease, largely because such an agent has not been propagated in suitable laboratory animals or in tissue culture.

The present report deals with two related outbreaks of diarrhea among infants from whom it was possible to isolate a virus clearly responsible for the illness. During the summer of 1956, an outbreak of diarrhea occurred among infants in the premature nursery of the New York Hospital. The inmates of this particular nursery had been studied closely for the preceding six months as part of a general investigation into the effect of viral infection on premature infants. In the four-week period preceding the outbreak, no viruses had been detected in this population by weekly throat and rectal swabs.

## Epidemiologic Investigation

The first case of diarrhea occurred on July 29; two days later, a second infant became ill. The outbreak then built up gradually and ended abruptly within one week of its onset. Twelve of 21 infants in the nursery were affected. The epidemiologic features of the outbreak are of interest. The premature nursery consists of four separate units, opening into a common corridor. The nursery and medical personnel is the same for all four units. Standards of cleanliness and of nursing and medical care are very high.

Although all infants were individually isolated, cases of diarrhea occurred in all four rooms and appeared distributed at random. Infants in incubators were affected as frequently as those in bassinets. As demonstrated in figures 1 and 2, age and weight did not affect the attack rate. The ages of the affected infants ranged from 6 to 46 days and the weights from 1,000 to 2,200 Gm. (2 lb. 3 oz. to 4 lb. 14 oz.).

A detailed epidemiologic survey failed to suggest any noninfectious causes for the diarrhea. There was no evidence of bacteriological or chemical contamination of formula or water, nor could antibiotics or vitamins be shown to be responsible.

## Description of Illness

Clinically, the disease was not severe. None of the sick infants showed significant temperature elevations or hypothermia. Two babies developed moderate abdominal distention; six others appeared lethargic or listless. Physical examinations were otherwise unremarkable; no mucous membrane lesions were noted.

Generally, the diarrhea persisted from one to five days, with a mean duration of three days. Most of the infants passed five or six fairly large, watery, greenish stools each day; on occasion these were expelled explosively. Mucus or pus cells were not present, but in two of the infants small flecks of bright blood were noted on a single occasion.

The illness was treated by a reduction in caloric content of feedings, supplemented by the parenteral administration of water and electrolytes whenever indicated. After subsidence of the diarrhea, the babies were gradually returned to their normal formulas, without recurrence of disease.

From the Department of Pediatrics, The New York Hospital–Cornell Medical Center.

### Microbiological Investigations

Because of the obscure origin of the diarrhea, intensive microbiological investigations were conducted. Rectal and nose and throat swabs were collected on at least two separate occasions from

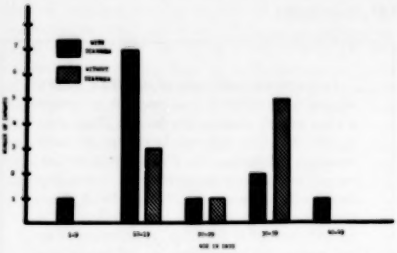


Fig. 1.—Distribution of infants with or without diarrhea, by age.

all infants in the nursery, irrespective of whether they were sick or well. Additional specimens were collected from sick infants as soon as the onset of diarrhea was noted. Acute and convalescent blood samples were obtained three weeks apart from sick infants, and a single blood specimen was collected two to four weeks after termination of the outbreak from those who had remained well. Throat and stool cultures and blood samples were obtained from the nursing and medical personnel, all of whom were in good health at the time.

The rectal swabs from infants were examined for the presence of bacterial agents by the methods described by Edwards and Ewing.* No Salmonella or Shigella organisms were found. Escherichia coli were isolated from swabs of 7 of the 12 sick infants and from a similar proportion of those who remained well. These strains were tested with typing serums against the potentially pathogenic serotypes (0-26, 0-55, 0-86, 0-111, 0-119, 0-125, 0-126, 0-127), but no agglutination was obtained. Throat swabs were plated by use of standard bacteriological methods; again no differences between the flora of the sick and well infants were observed. Stool and throat cultures from the staff were unrevealing; no Salmonella or Shigella organisms were found in the stools; and the respiratory tract flora were unremarkable. Investigations aimed at detecting the presence of viral agents were carried out concurrently.

Each specimen from nose, throat, and rectum was suspended in a balanced salt solution containing penicillin, streptomycin, and nystatin (Mycostatin). After further clarification of stool suspensions by centrifugation, aliquots of all materials were inoculated directly into monolayer stationary cultures of both human amnion and monkey kidney tissue. The cultures were observed for possible cytopathogenic effect for 7 to 14 days; those which failed to show definite tissue changes were subcultured through three successive passages before being considered negative.

No cytopathogenic effects appeared in any human amnion cultures inoculated with stool specimens from infants, but in monkey kidney tissue, stools from 10 of 12 sick infants showed an agent by the ninth day of the first passage. The cytopathogenic effect produced was similar to that observed with poliomyelitis viruses. No agent was isolated from the rectal swabs of nine well infants. On the other hand, stool cultures from 5 of 26 members of the nursing staff revealed agents with a poliomyelitis-like tissue action; two of these produced cytopathogenic changes in kidney tissue only, while three others grew out simultaneously in the first amnion passage. Throat cultures from infants and staff failed to reveal any agents in these tissues.

In order to determine the relationship of the 15 newly isolated gastrointestinal agents to each other, antiserum was prepared in rabbits against the virus isolated from one infant, designated the $B_1$ strain. All agents were then tested against the $B_1$ antiserum by standard tissue-culture neutralization methods. The results are shown in the table. The $B_1$ antiserum neutralized in approximately equal dilutions not only the homologous virus but all other strains isolated from infants and two of the five obtained from the nursing staff. Cross-neutralization tests subsequently confirmed the fact that these strains are immunologically identical, except for $S_2$, $S_4$, $S_5$. The 12 identical strains will be referred to collectively as the $N_5$ virus. $S_2$ was subsequently identified as poliomyelitis virus type 1; the identity of $S_4$ and $S_5$ has not been determined.

The blood specimens obtained were tested for the presence of neutralizing antibodies to the $N_5$ virus. Because of the small amounts of blood ob-

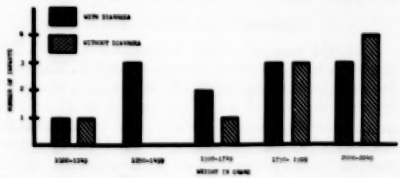


Fig. 2.—Distribution of infants with or without diarrhea, by weight.

tainable from premature infants, only serum dilutions of 1:2 and 1:16 were tested against 50 tissue culture doses of virus. All 12 infants with diarrhea showed a rise in antibody to 1:16 or above; none of the well infants had antibodies of 1:2 or higher.

V 1
195

Both nurses from whom the $N_5$ agent was recovered showed antibody titers of 1:8 in their acute phase specimen, which had risen to 1:64 two weeks later.

Thus, all infants with diarrhea showed evidence of infection with $N_5$ virus, while none of the well infants did. A Chi-square test showed that this difference is highly significant ($p<0.001$).

Two weeks after the end of this outbreak, tissue cultures of stool specimens collected from all infants in the premature nursery once again failed to show the presence of a virus.

### Outbreak of Diarrhea Among Full-term and Older Infants

Four days after the termination of the outbreak among premature infants, diarrhea was noted among patients in a sick infant ward in the same hospital. Within a four-day period, five babies became ill with signs and symptoms similar to but somewhat more severe than those shown by the prematures. The age of these patients ranged from one week to two months and their weight from 3,300 Gm. to 6,200 Gm. (7 lb. 8 oz. to 13 lb. 10 oz.).

Bacteriological studies on stools and respiratory tract secretions were unremarkable, but with use of monkey kidney tissue cultures, cytopathogenic agents subsequently shown to be identical to the $N_5$ virus were recovered from the stools of all five infants with diarrhea. No virus was found in 10 well infants on the same ward. Paired acute and convalescent serum specimens from the sick patients showed fourfold rises in antibody titer to $N_5$ virus.

An investigation into the source of this second outbreak revealed that one of the two nurses from whom $N_5$ virus had been recovered in the survey of the premature nursery staff had supervised the sick infants floor three days prior to the outbreak of diarrhea in the first baby. She recalled having handled at least two of the infants who subsequently became ill.

### Identification of $N_5$ Virus

Identification of the $N_5$ virus was attempted. The tissue affinity and the type of cytopathogenic effect obtained suggested that this agent belongs to the enteric cytopathogenic human orphan (ECHO) group. This impression is supported by the findings that it is nonpathogenic to suckling mice, and therefore probably not a Coxsackie agent; antiserums to the three types of poliomyelitis virus do not neutralize it, and it does not possess the complement-fixing antigen common to the adenoviruses.

The virus was tested against antiserums prepared with the 14 prototyped ECHO agents recognized at the time, and against antiserums to five similar enteric viruses more recently isolated by Ramos-Alvarez in A. B. Sabin's laboratory.[9] Comprehensive neutralization and cross-neutralization tests revealed the immunologic identity of the $N_5$ virus and the D-3 prototype of Ramos-Alvarez and Sabin. The D-3 virus has subsequently been accepted as ECHO type 18 by the committee on the ECHO viruses.

### Comment

After the advent of tissue culture methods, virology entered an era similar to that faced by bacteriologists more than 60 years ago. The application of new tools to the search for microbes led to the discovery of innumerable new agents. At the present time, the chief problem in virology probably is not so much the isolation of new agents but rather the determination of the role that already known agents play in the causation of disease.

The simple, temporal association of commonly occurring viruses with some disease entity cannot be accepted as proof that this particular agent is responsible for the observed illness. Before a virus can be called the "cause" of any disease, much additional evidence must be obtained, most important of which is perhaps that available through epidemiologic methods.

*Tissue Affinity and Results of Neutralization Tests on Viruses Obtained from Infants and Staff*

| Source | Virus Strain | Cytopathogenic Action in Human Amnion Culture* | Neutralized by Rabbit Antiserum to B-1 Strain |
|---|---|---|---|
| Infants | B-1 | No | Yes |
| | B-2 | No | Yes |
| | B-3 | No | Yes |
| | B-4 | No | Yes |
| | B-5 | No | Yes |
| | B-6 | No | Yes |
| | B-7 | No | Yes |
| | B-8 | No | Yes |
| | B-9 | No | Yes |
| | B-10 | No | Yes |
| Staff | S-1 | No | Yes |
| | S-2 | Yes | No† |
| | S-3 | Yes | No‡ |
| | S-4 | No | Yes |
| | S-5 | Yes | No‡ |

* All viruses showed cytopathogenic action in monkey kidney cultures.
† Neutralized by poliomyelitis type 1 antiserum.
‡ Unidentified agents.

The evidence that ECHO 18 is etiologically related to diarrhea in infants may be summarized as follows: 1. Evidence of infection with the virus was found in every infant with diarrhea, but not in those who remained well. These differences showed a high order of significance by statistical test, indicating that chance association was unlikely. 2. A significant rise in antibodies to ECHO 18 occurred in all infants with the disease and was temporally related to the course of the illness. 3. ECHO 18 was found among infants in the premature nursery only during the course of the outbreak; the virus was not present before or after the epidemic had run its course. 4. A second outbreak occurred among other infants in a different part of the same

hospital after exposure to a nurse known to be excreting ECHO 18. Again, a definite association between the presence of the virus and the appearance of diarrhea was demonstrated. 5. ECHO 18, in our experience, is not a commonly occurring virus. We have been unable to isolate it from nearly 100 stool specimens obtained from young children with various types of illnesses.

The conclusion that ECHO 18 caused the two separate but related outbreaks of diarrhea is thus strongly supported by epidemiologic, immunologic, and statistical analyses. It is perhaps fortunate that in this instance ECHO 18 had an "all or none" effect on its hosts; when the virus was present, diarrhea invariably occurred. Had the agent caused any appreciable amount of subclinical illness, the statistical approach might not have provided an answer.

It is obvious that absolutely incontrovertible evidence in favor of the association between the virus and diarrhea might be obtained by suitably designed observations with human volunteers. The possibility must then be considered that this agent may on occasion produce an entirely different clinical syndrome in older children and adults; thus studies of this type might not be worth the risk.

Of some clinical interest are the observations concerning the course of the illness in premature infants. Considering their relatively poor response to bacterial infection, these infants withstood their illness surprisingly well. Not only was the disease relatively mild but a prompt antibody response occurred, sufficient to control the infection in a short time.

## Summary

Evidence has been presented linking ECHO virus type 18 to two separate but closely related outbreaks of diarrhea in premature and older full-term infants. This represents the first instance in which a virus isolatable by laboratory methods has been shown to be a cause of an outbreak of epidemic diarrhea.

525 E. 68th St. (21) (Dr. Eichenwald).

This study was supported by a research grant of the Institute of Allergy and Infectious Diseases, National Institutes of Health.

Dr. W. H. Ewing of the Communicable Disease Center, U. S. Public Health Service, supplied the Esch. coli typing serums used in this study. Virus antiserums and prototypes were kindly supplied by Dr. Albert B. Sabin.

## References

1. Higgins, A. R.; Floyd, T. M.; and Kader, M. A.: Studies in Shigellosis: II. Observations on Incidence and Etiology of Diarrheal Disease in Egyptian Village Children, Am. J. Trop. Med. **4**:271-280 (March) 1955.

2. Gordon, I.: Nonamebic, Nonbacillary Diarrheal Disorders, Am. J. Trop. Med. **4**:739-755 (July) 1955.

3. Reimann, H. A.; Hodges, J. H.; and Price, A. H.: Epidemic Diarrhea, Nausea and Vomiting of Unknown Cause, J. A. M. A. **127**:1-6 (Jan. 6) 1945.

4. (*a*) Gordon, I.; Meneely, J. K., Jr.; Currie, G. D.; and Chicoine, A.: Clinical Laboratory Studies in Experimentally-Induced Epidemic Nonbacterial Gastroenteritis, J. Lab. & Clin. Med. **41**:133-141 (Jan.) 1953. (*b*) Yamamoto, A.; Zennoyosi, H.; Yanagita, K.; and Kato, S.: Research in Causative Agent of Epidemic Gastroenteritis Which Prevailed in Japan in 1948, Japanese M. J. **1**:379-384 (Dec.) 1948.

5. Light, J. S., and Hodes, H. L.: Studies on Epidemic Diarrhea of New-born: Isolation of Filtrable Agent Causing Diarrhea in Calves, Am. J. Pub. Health **33**:1451-1454 (Dec.) 1943.

6. Buddingh, G. J., and Dodd, K.: Stomatitis and Diarrhea of Infants Caused by Hitherto Unrecognized Virus, J. Pediat. **25**:105-113 (Aug.) 1944.

7. Higgins, A. R.: Case for Viral Diarrheal Disease, Editorial, Am. J. Med. **21**:157-160 (Aug.) 1956.

8. Edwards, P. R., and Ewing, W. H.: Identification of Enterobacteriaceae, Minneapolis, Burgess Publishing Company, 1955.

9. Ramos-Alvarez, M.: Cytopathogenic Enteric Viruses Associated with Undifferentiated Diarrheal Syndromes in Early Childhood, Ann. New York Acad. Sc. **67**:326-331 (April 19) 1957.

---

**MENTAL RETARDATION IN PHENYLKETONURIA.**—Phenylketonuria is a condition in which there is an inherited biochemical defect in the normal oxidation of phenylalanine to tyrosine. . . . Persons with this defect are almost always mentally retarded, usually to a severe degree. Most authors make no comment, or only incidental mention, of seizures in patients with phenylketonuria, but Cowie, Woolf and Vulliamy, and Bosma and associates have commented upon the frequency of coincident epilepsy. Penrose mentioned in 1946 that some affected children had seizures but that he had never observed them in phenylketonuric adults. The incidence of this disease in the population at large is not known; the frequency in institutions for retarded children was found to be 1% in the northeastern United States by Jervis, 1% in Utah, 1.2% in Britain, and 0.04% in Switzerland. Because this metabolic entity has been well studied chemically and clinically, because we find seizures frequently, and because control of the chemical aberrations has been achieved by dietary means, phenylketonuria lends itself well as a model for electroencephalographic (EEG) studies of metabolic disease affecting the brain.—N. L. Low, M.D., J. F. Bosma, M.D., and M. D. Armstrong, Ph.D., Studies on Phenylketonuria, *A. M. A. Archives of Neurology and Psychiatry*, April, 1957.

# URGENT SURGERY FOR FINGER FLEXOR TENDON AND NERVE LACERATIONS

## WITH EMPHASIS ON ADVANCEMENT OF THE DIVIDED PROFUNDUS TENDON DISTAL TO THE LEVEL OF LACERATION

Kenath H. Sponsel, M.D., Minneapolis

*Injuries to the flexor surfaces of the fingers and thumb may divide the tendons of the superficial and deep flexor muscles, damage the corresponding tendon sheaths, or interrupt digital sensory nerves. The effects on functions are devastating, especially if both the profundus and the sublimis tendons have been cut, unless surgical repair is successful. Infection, rough handling, probing, and too much dissection make for poor results. In very clean wounds an expert can restore fair or good function. When the surgeon encounters a contused or contaminated wound, or is in doubt how to proceed, he will best serve the patient by cleansing the wound and closing it without tendon repair. After the wound is well healed, a tendon graft can be performed. The techniques here described emphasize the possibility of locating the tendon sutures at levels other than the site of laceration, so as to minimize adhesion and scarring. In some situations it is necessary to excise the sublimis tendon and rely on suturing the profundus. If the profundus tendon has been divided by a laceration less than 2 cm. from its insertion, the proximal end of the lacerated tendon can be advanced for attachment to the distal phalanx. It is essential that the wrist and finger joints be kept in a properly flexed position by external immobilization during the period of healing.*

This article is an outline for the care of flexor surface lacerations to the fingers and thumb. It is hoped that it will serve as a guide for the surgeon whose experience is insufficient to have established a definite pattern of care for injuries at different levels of the fingers and thumb. The concept of advancing the divided profundus tendon distal to the level of laceration is emphasized. By so doing, the cutaneous laceration and the tendon laceration do not granulate and scar at the same area.

### General Anatomy

Each finger is essentially the same, having two flexor tendons, sublimis to the middle phalanx and profundus to the distal phalanx. The intrinsic hand muscles flex the proximal phalanx. The thumb differs, having only one long flexor tendon which motivates the distal phalanx, and the intrinsic hand muscles flex the proximal phalanx, there being no middle phalanx. Each digit has two volar digital nerves, one ulnar and one radial. The long flexor of the thumb and the sublimis and profundus tendons of the fingers run in relatively nonexpandable conduits or tendon sheaths, from proximal to the metacarpal heads to the distal joints. Minor repeated traumas of everyday use lead to stenosing tenosynovitis interfering with smooth gliding of the tendons within the sheaths. Major trauma of laceration through the skin, subcutaneous fibrofatty tissue, tendon, sheath, nerve, and periosteum of the phalanges is devastating to function.

### History of Injury

"Where, when, and how" the injury was sustained are important.

*Where.*—The surrounding of farm or factory may influence the nature of the wounding.

*When.*—The time elapsed after injury influences the treatment. Tendon suture is rarely undertaken if the wound is over six hours old. Exceptions are made in very clean incised wounds with minimal contamination.

*How.*—The mechanism of injury and the object causing the tendon division are important in deciding what may be accomplished.

The cooperation of the patient and his tissue reaction in past injuries, as well as his age, are factors influencing the final outcome. Failure results when infection supervenes after the wounding and initial surgery.

### Examination

The local examination is carried out under aseptic conditions with the examiner masked. With complete tendon division, the finger is straight beyond the laceration, i. e., the position of function in semiflexion is absent. In the adult, active motion of each joint of the involved digit and sensation to pinprick are tested. In the child, active motion may be observed, but sensation testing is usually inconclusive. In uncooperative adults and children, one should assume that the adjacent digital nerves are

From the Division of Orthopaedic Surgery, Department of Surgery, University of Minnesota Medical School.

divided at the wound level until continuity or division is demonstrated at surgery. Many times the periosteum or joint capsule is divided deep in the wound.

Wounds should not be explored or probed at this stage. Explorations are withheld until the surgical field is properly prepared. The x-ray may indicate a depression of the cortex of the phalanx, a fracture, or the presence of a foreign body. Tendons are not primarily sutured in fractured fingers.

## Operation

*Dry Field and Anesthesia.*—Surgical damage is held to a minimum by careful handling of tissues clearly visualized in a dry field by a pneumatic tourniquet in a patient under general anesthesia. When local or wrist nerve-block anesthesia in the hand and fingers is the choice, relatively painless hemostasis may be obtained by wrapping the forearm with a gum rubber bandage. This broad compression of the forearm can usually be tolerated for between 30 and 60 minutes in a patient under sedation and narcosis. A rubber-band tourniquet at the base of the finger is not recommended, nor is ulnar nerve block in the confining sulcus at the elbow. Both of these techniques may lead to chronic compression neuritis.

*Wound Preparation.*—The extremity is scrubbed to the wound edges for at least 10 minutes with white or green soap. Alcohol and other skin antiseptic solutions may be used but certainly not in the wound. The wound is extensively irrigated with saline solution. Mechanical cleansing may be facilitated by daubing the wound with a sponge wet with saline solution while the irrigating stream of saline solution is directed into the wound. In instances where surgery is undertaken with use of local anesthesia, it is well to do a regional nerve block prior to final irrigation and cleansing of the wound.

*Instruments, Technique, and Suture Materials.*—Adequate instruments should be available in practically every operating room. These include dural-type forceps, other small thumb forceps, mosquito hemostats, skin hooks, small rake retractors, the Bard-Parker no. 15 blade on the small handle, and small sponges. The bulb-type syringe should be available for irrigating with saline solution. Small semicircle needles used in eye surgery and small, straight, round needles are included.

The preferable technique is minimal handling of the tendon and tendon sheaths. Bleeding is held to a minimum by the pneumatic tourniquet. The wound is irrigated with saline solution to free it of discoloration and blood. This solution is blotted up gently with a moistened sponge. Dry sponges are not blotted against tendons or tendon sheaths.

Often it is desirable to drill a hole in bone for tendon fixation at the distal phalanx. The cutting type of straight skin needle is used as a drill point (fig. 1*D*). This needle is simply placed in the regular type of hand drill and drilled across the distal phalanx and out through the nail. Two such needles are inserted. The wire sutures from the proximal tendon are threaded through the eye of the needles and pulled through the phalanx and nail and are tied over the nail without special buttons or pads.

Suture material is limited to wire and silk. The single-filament no. 34 and no. 36 stainless steel wire may be used. The silk preferred is 000000 braided white silk. This silk suture is available on swaged needles of a small caliber which are either straight or curved. These swaged needles pass through the tendons or nerve with a minimal injury to the tissue.

The tourniquet is released prior to closure for completion of hemostasis.

*Wound Exploration.*—It is usually necessary to extend the wound both proximally and distally. This is done with the least harm by extending the laceration to the lateral midline between the flexor and extensor surfaces (fig. 1*A*, *B*, *C*, and 2*A*, *B*, *C*). The incisions may be extended proximally laterally on one side of the finger and distally in the lateral midline on the other side of the finger. Adhesion of tendon to incision and flexion contracture will result from extending the laceration longitudinally along the flexor surface of the finger.

When extending the wound, care must be exercised to incise only the skin and the subcutaneous tissue superficial to the neurovascular bundle (fig. 1*B*, *C*, and 2*B*, *C*). When there is doubt about the identification of the neurovascular bundle, the undermining of the skin should start in the area of normal tissue. Then one can work toward the edge of the laceration. If the digital artery is lacerated, one can be almost certain that the nerve is cut. The nerve end may be identified by gentle spreading of the tissues with a mosquito hemostat. Between 3 and 10 fibrils are contained within the nerve. The vessel should not be ligated until the nerve ends are identified. Identification may be maintained with a tag of 000000 silk suture. Both digital nerves should have preoperative function, or they should be explored and sutured as necessary.

The tendons are larger and more easily identified. The distal end is the easiest to find. The sheath should be opened laterally. The distance of proximal tendon retraction depends on the strength of the muscular contraction at the time of tendon division. When the profundus tendon is divided in the distal half of the finger, it may be prevented from retraction into the palm by the mesotendon at the level of the middle phalanx. Laceration in the proximal half of the finger leads to considerable retraction of one or both flexor tendons. Identification of the tendons may be necessary by transverse incision in the palm of the hand just proximal to the distal palmar crease (fig. 2*D*). Identification of the pro-

fundus tendon is made by the attachment of the lumbrical muscle. The sublimis tendon has no muscle attachment in the hand. Hemorrhage into the tendon sheath may be mistaken for lumbrical muscle. The most innocuous instrument for guiding the tendon back into the sheath is a fine-caliber, moistened catheter. It is introduced from either the surgical palm wound or the laceration. At the time of the identification of the proximal end of the divided tendon, a 000000 white silk suture or no. 34 to 36 stainless steel wire is interwoven in the distal 0.25 in. of the tendon. This in turn is tied or sutured to the catheter. By leaving several inches of suture between the tendon end and the catheter, one may preserve this suture for use in the final tendon anastomosis.

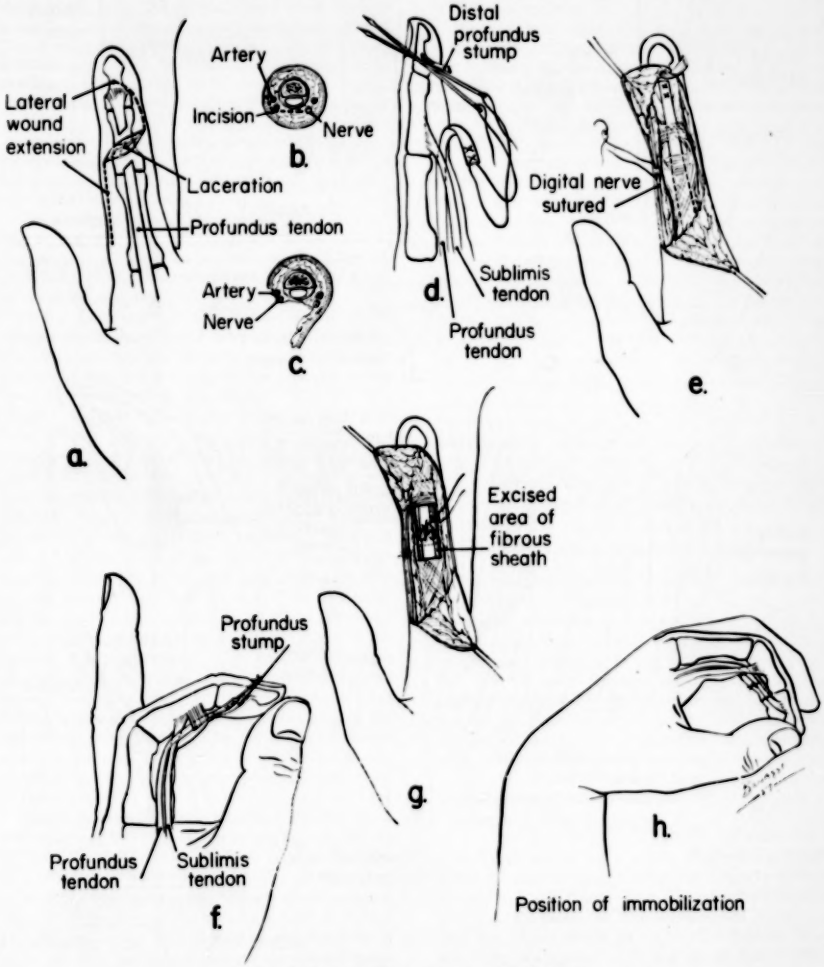



Fig. 1.—Primary tendon suture at middle phalanx.

**Tendon Repair at Different Levels—Fingers**

*Injury—Laceration Within One Inch of Insertion of Profundus, Only Profundus Tendon Divided* (fig. 1A, *D*, *E*, *F*).—Advance the proximal end of the lacerated tendon to the finger tip.

This procedure is carried out by extending the incision laterally up to the middle of the distal phalanx and then across the pulp to about the middle of the flexor surface. Expose the distal stump of the flexor tendon and pull it out of the flexor

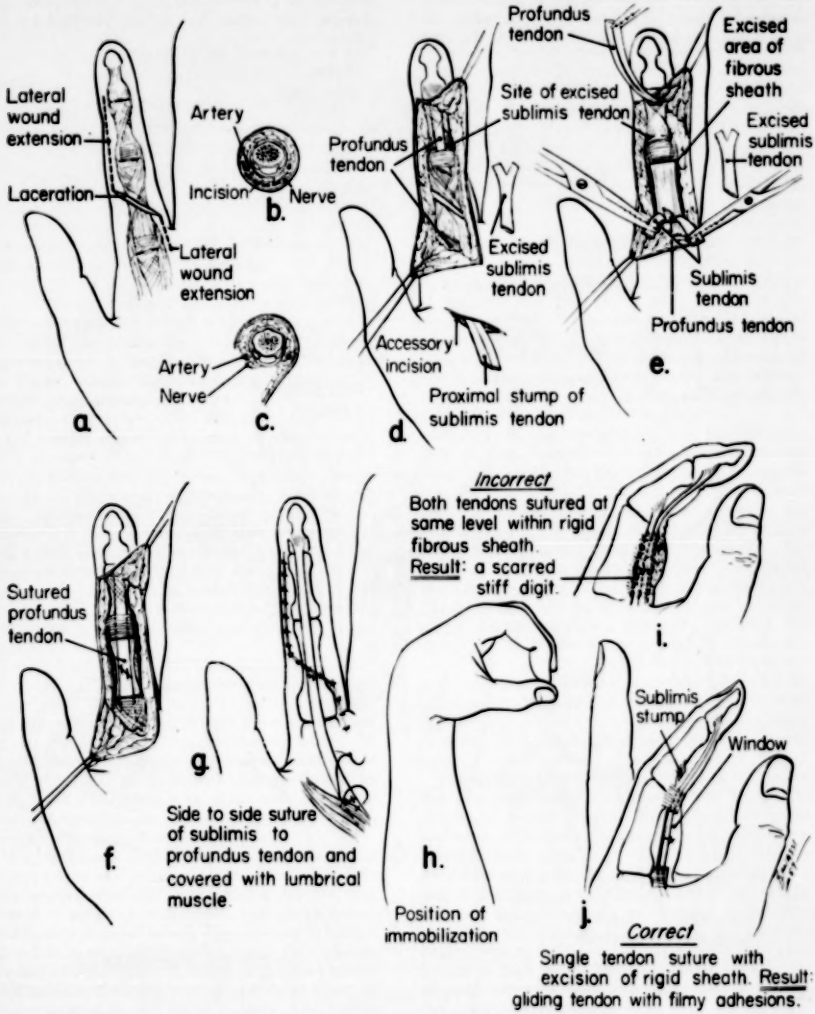



Fig. 2.—Primary tendon suture at proximal phalanx.

sheath. Roughen the bone underneath the insertion for the receiving of the new tendon insertion. Two straight cutting needles are directed from the incision through the bony phalanx and out through the nail. Both are left protruding on each side of the finger. A stainless steel suture, no. 34 wire, is woven through the distal 0.25 in. of the proximal end of the profundus tendon. Wires are directed through the distal sheath. Each wire is put through a needle. Care is given to avoid twisting the tendon. The needles are withdrawn through the nail, leaving the wires. With the wrist and finger flexed, the tendon is easily pulled to its new insertion at the distal phalanx. The wire sutures are tied over the finger nail. The distal stump is trimmed so that the raw area is against the advanced tendon. The stump is laid over the transferred tendon. A suture holds each side of the advanced tendon to the overlaid stump (fig. 1*F*).

The divided nerves are sutured with 000000 white silk or eye silk. The tendon sheath is not sutured. The wound is closed by approximation of the tissues as required. Skin sutures are all that are needed in many instances.

*Injury—Laceration of the Middle Third of the Finger, Profundus Tendon Divided* (fig. 1*G, H*).—Either suture tendon end to end or resect a short portion of the distal stump to the advance suture line, then make end to end suture.

When the profundus tendon is divided more than 1 in. from its insertion, but distal to the proximal interphalangeal joint, an end to end anastomosis is indicated. This may be associated with some laceration of a portion of the sublimis tendon as it spreads laterally. Under these circumstances the sublimis laceration is smoothed. If the profundus tendon is sutured at the level of the injury to the sublimis tendon, adherence surely will take place (fig. 2*I*). In this instance the distal stump of the profundus tendon may be shortened 0.25 to 0.5 in. This permits the end to end suture at a point distal to the injured sublimis tendon. The tendon suture is interwoven in each end of the divided profundus tendon and then tied. A window of the tendon sheath is removed for 0.5 in. on either side of the suture line.[1] The tendon callus will be less adherent to subcutaneous fat than it would be to tendon sheath (fig. 2*J*). Appropriate nerve and skin repair is carried out.

*Injury—Laceration Over Proximal Phalanx, Both Sublimis and Profundus Divided* (fig. 2*A, D, E, F, G*).—Excision of the sublimis tendon and end to end suture of profundus tendon should be done.

This is a devastating injury. Only those surgeons mastering simpler tendon injuries should undertake the primary repair. Should the operator have doubt as to his skill, he should prepare the wound properly, approximate the nerves in the usual fashion, and close the wound. No attempt should be made to approximate tendons. Exploring for the tendons or excessive handling of the tissues promotes fibrosis. The scarring should be kept to a minimum so that the bypass of the scar by the tendon graft will accomplish its purpose of nonadherence to the wound. Within three or four weeks an elective tendon graft may be performed by one familiar with the procedure.

When urgent reparative surgery is undertaken with primary tendon suture, it is necessary to excise the sublimis tendon from its insertion to a point proximal to the tendon sheath in the palm of the hand (fig. 2*D, E*). Sublimis and profundus tendons may be sutured side by side in the palm to give a two-muscle, one-tendon finger (fig. 2*D, G*). An alternate method is to pull the sublimis tendon out of the laceration, cut the proximal portion, and permit it to retract (fig. 2*E*). Thereafter, the profundus tendon is sutured. A broad window is removed from the tendon sheath in the area of suture. Excessive handling of the fibrous tendon sheath and the tendons in this area of so-called "no man's land" between the distal palmar crease and the level of the proximal interphalangeal joint leads to extensive scarring (fig. 2*I*). Probing and dissecting in this area contributes to adhesion. Suture of both tendons at the same level leads to a single scarred tendon.

In very clean wounds in the hands of experts excision of the sublimis and suture of the profundus give good to fair functioning fingers. I believe that many are teaching initial wound surgery with closure and later tendon grafting for these severe wounds.

### Tendon Repair at Different Levels—Thumb

The long flexor tendon of the thumb may easily be advanced if laceration is within an inch of the insertion. Otherwise, end to end suture may be accomplished. With careful handling, one should expect good results from this repair. Adherence of the sutured area depends considerably on the amount of damage to the small muscles of the thumb. Surgical repair in the area of the small muscles of the thumb is prolonged and traumatic when attempted without a tourniquet. Special care must be exercised to prevent further injury to the digital nerves. Divided nerves must be repaired.

### Postoperative Care

Bulky dressings are applied. The wrist is flexed about 45 degrees, and the finger is flexed sufficiently to touch the thumb (fig. 1*H* and 2*H*). Gauze dressings are placed next to the wounds. Position is held by plaster splints or a cast. In children, long arm casts are applied with the elbow flexed. Children may wiggle out of the short arm casts and

splints. A distal shift of the splint will straighten the wrist and finger and may disrupt the tendon and nerve suture.

An early dressing change is essential in hot weather to prevent maceration of the wound edge by perspiration and bloody dressings. Perhaps all patients should have the initial bloody dressing changed to prevent maceration.

The wrist and finger are held in flexion for three weeks. During the third week the patient may wiggle the finger in the dressings. The wire suture emerging from the fingernail bed is pulled out three to four weeks after the surgical repair. One side of the wire loop is cut near the fingernail. The knot and the remaining portion of the wire are gently pulled out of the distal phalanx. If the wire does not come easily, a square of adhesive tape is simply placed over the wire and the fingernail. One week later the wire is again slowly drawn out. In the rare instance that the wire cannot be pulled easily, both edges of the loop may be cut close to the fingernail, to be covered by the fingernail as it grows out. No harm will result therefrom.

During the fourth week, a splint holding the wrist straight is applied. This is removed two or three times a day for soaking in warm water. Active motion is attempted. Passive motion is not tried at any time. By the end of the fifth week the patient should try to do light manual work.

Beginning with the fifth week the patient discards all splinting. He is urged to exercise each joint of the finger individually, holding the proximal portions of the finger and the wrist straight with the other hand. Those who perform muscular work tend to get the best results.

## Comment

The occasional surgeon should expect good results from advancement of the tendon to the tip of the finger. In effect, this procedure places normal tendon at the level of the laceration. End to end suture of the profundus tendon unaccompanied by injury to the sublimis tendon should give good results. Stiff and awkward fingers result from suture of both tendons at the same level (fig. 2*I*). Primary suture of the profundus tendon with excision of the sublimis tendon gives good results in some cases. Such surgery will be better left to the more experienced surgeon. Tendon grafting is a procedure to be undertaken by those who have mastered the primary phases of tendon repair.

Tendon graft to replace the profundus in cases of good function of the sublimis is not advocated. The operative procedure necessitates manipulation and handling of the whole sublimis tendon into the hand. This leads to some adhesion in the sheath from the palm of the hand to the middle phalanx. Recovery of function is not sufficient in the distal joint of the finger to justify reduction of normal function at the proximal interphalangeal joint and at the metacarpophalangeal joint.

Cleansing of the wound, nerve repair, and wound closure is a recommended procedure when both tendons are divided. Later a tendon graft may be accomplished under ideal conditions. Should adherence of primarily sutured tendons prevent active motion, lysis of the repaired tendon is a wasted procedure. A finger is suitable for tendon graft if all other tissues in the finger are good. Had primary suture not been attempted, less scarring would be present for the grafted tendon.

Occasionally, a stab wound in the proximal portion of the finger may divide the profundus tendon but not the sublimis tendon. At this level, the fibrous sheath is well defined. Personal experience with repair of the profundus tendon at this level has not been good. The level of end to end suture may be advanced. If no suture is done, the finger will have a normal metacarpal phalangeal joint and good motion at the proximal interphalangeal joint. The loss of active motion at the distal joint in an otherwise normal finger is preferred to one with a little motion at each interphalangeal joint as a result of surgical failure of the profundus suture.

Another observation is the lack of recovery of hyperextension of the interphalangeal joint of the thumb after fixation of the digit in flexion for three weeks during the tendon healing period. The degree of hyperextension varies in individuals. Its loss does not appreciably reduce the function of the thumb.

Attempted motion before three weeks' healing time is not successful. It is doubted that any suture can be placed in these tendons that will eliminate the need for external immobilization.

## Conclusions

In the management of flexor tendon injuries in the fingers and thumb, the tendon suture may be advantageously advanced beyond the level of laceration. Adhesion is thereby minimized. Nerves should be sutured delicately. Recovery of sensation is the rule. External immobilization of the wrist and involved fingers is advocated.

605 Tenth Ave. South (4).

### References

1. Mason, M. L.: Primary and Secondary Tendon Suture: Discussion of Significance of Technique in Tendon Surgery, Surg., Gynec. & Obst. 70:392-402 (Feb., no. 2A) 1940.

2. Koch, S. L.: Some Surgical Principles in Repair of Divided Nerves and Tendons, Quart. Bull., Northwestern Univ. M. School 14:1-8, 1940.

3. Bunnell, S.: Surgery of Hand, ed. 3, Philadelphia, J. B. Lippincott Company, 1956.

# DIAGNOSIS, PROGNOSIS, AND REHABILITATION IN PATIENTS WITH APHASIA

Earl F. Hoerner, M.D.
and
Betty Horowitz, B.S., West Orange, N. J.

*A patient recovering from a cerebrovascular accident needs all of the support and encouragement that can be provided in view of the organic and psychological trauma he has suffered. The existing aphasia should be considered as a disturbance having four aspects or involving four functions: understanding, talking, reading, and writing. Careful diagnostic tests identify the nature of the impairment and form the basis for establishing a program of therapy. The goals are thought of in terms of basic communication, home adequacy, social acceptability, and vocational adequacy. In a large rehabilitation center an aphasia therapist should assume leadership in helping other members of the rehabilitation team to understand the patient and to coordinate the program. Group therapy is applicable in many forms, and it helps to provide multistimuli situations. The families of aphasic patients also need support and guidance. A family group session sometimes helps to bridge the gaps from the rehabilitation center to the sheltered family home and thence to the world outside.*

The aphasic patient presents a complex and difficult problem to all concerned; however, through careful evaluation of his medical, physical, language, social, and personality status, much can be done to help him. There are those in the medical and rehabilitation fields who regard the aphasic patient as hopeless or who contend that a rehabilitation program has no significant influence on the improvement of such a patient's ability to communicate. These workers insist that, after a cerebrovascular accident, recovery of communication mechanism, if it will occur, is based on spontaneous recovery within the nervous system by reorganization processes of the residual cerebral functional capacity. Nature does, and must, play its role in the readjustment period, but such spontaneous restitution is of value to the patient only if controlled stimuli are applied to provide its integration and function.[1]

It has been well established, however, that early retraining does much to increase the functional language ability of the patient and aids in alleviating the depression and anxiety which, in themselves, create havoc with his general language function. We have found that those patients who are seen early after the loss of their language ability are better able to adjust and are better motivated than those who, through either poor advice or lack of information, delay therapy.

The unique psychological status of one who finds himself suddenly without (or with depleted) speech is overwhelming. No definitive psychotherapeutic measures are of value in these situations; however, much of the emotional support which comes from a patient-therapist relationship is essential and implicit in a rehabilitation team. Without it, no amount of routine retraining is of value—nor will nature, in its act of spontaneous recovery, provide it. These patients need all of the support and encouragement that can be provided in view of the organic and psychological trauma they have suffered.

Emphasis in the treatment program is based on the concept of the whole patient.[2] How a person handles environmental stress and stimuli is dependent on the dynamic combination of three basic factors. These are his physical abilities, his emotional status (inner resources), and his social surroundings. Even though one of these factors may be deficient, it has been found that satisfactory adjustment may be made in the other two. This is possible through utilization of the reserve physical potential, reorientation of the inner (emotional) reserves, and control or correction of the social environment. New combinations of these may be found and used by the disabled person so that an adequate adjustment can be made for meeting the stresses which occur in his life.

It is the purpose of this paper to attempt to clarify the methods and benefits of working with aphasic patients within the framework of the general rehabilitation team setup, with emphasis on the language area.

Although most patients seen in a comprehensive rehabilitation setting are referred for "speech" help, an associated hemiplegia or hemiparesis usually exists. Many patients seem more concerned with

From the Kessler Institute for Rehabilitation.

Read before the Section on Physical Medicine at the 106th Annual Meeting of the American Medical Association, New York, June 5, 1957.

the inability to walk or to use an arm than with the more disabling loss of their speech. The process of reeducating the patient is not only directed at the language difficulty but is combined with a well-rounded physical restoration program. The benefits derived from such a comprehensive program and multidirected therapy have been encouraging and should be made available to all aphasic patients, regardless of whether there is an associated hemiplegia or other organic involvement.

## Diagnosis

From the standpoint of diagnosis and language evaluation, it is necessary to consider the patient in relation to the four main language modalities [3]: (1) understanding, (2) talking, (3) reading, and (4) writing. Disturbed function or impairment in one of these language modalities is reflected in the others, according to the dynamic theories of cerebral function as described by Schuell.[3]

Impairment, rather than complete loss of a language function, is generally found, since residual function is usually present. The therapist must determine which areas of language are predominantly affected in order to determine how to proceed with retraining, and he does so through a careful screening test which includes hearing and visual evaluation. This takes into consideration the patient's functional ability, that is, his language use incidental to performing such activities of daily living as using the telephone, writing his name, reading the newspaper, handling money, and using the calendar and clock. Ability in mathematics also must be investigated, from that required for simple calculation to that for more involved problems.

## Diagnostic Classifications

There are two working hypotheses of significance in making a diagnosis of aphasia: 1. Involvement and impairment of one of the cerebral functional areas is reflected in more than one language modality. 2. Impairment of any modality often involves more than one cerebral function. Just as an infant needs and depends on hearing, listening, and understanding to develop speech, an aphasic patient also needs these abilities. What happens to a deaf or hard-of-hearing child as a result only of his inability to hear is obvious. Evidence is available from work with the aphasic patient which indicates that many expressive disturbances are a direct result of deficiency in auditory understanding and that all aphasic patients show some disturbance in this language modality area. In this respect, it has been found possible to group patients into four different diagnostic classification groups [4]: (1) receptive-type aphasia, in which the primary difficulty appears to be comprehension; (2) expressive-type aphasia, in which the greatest difficulty exists in the expressive areas of language and might include some or all of the modalities of communication; (3) expressive-receptive aphasia, in which there is apparent equal involvement in both the expressive and receptive functions of language; and (4) global aphasia, in which there appears to be no language capacity in any area of communication.

*Receptive: Understanding.*—Disturbance in receptive function is usually present to some degree, since all language modalities serve to reinforce one another and loss in one area would necessarily affect another. However, when a patient is totally unable to recognize gross sounds or individual words, to match similar objects or forms, or to recognize written single words, prognosis is less favorable than if there existed only an inability to say or write the word, which is more predominantly an expressive disturbance.

Hearing and visual problems (hemianopsia) are frequently present and must be screened. The level of auditory understanding must be determined. Are gross sounds, words, letters, numbers, directions (both simple and complex), and conversation understood? To what extent is the auditory memory affected?

*Receptive: Reading.*—In the receptive-visual area the following determinations must be made: Can the patient match and recognize objects, pictures, letters, numbers, words, phrases? What is his reading-understanding level, on the basis of graded reading tests?

*Expressive: Talking.*—Problems of verbal expression must be evaluated. Can the patient imitate sounds, words, sentences? Is there an accompanying dysarthria? Does word-finding difficulty (anomia) exist, and is the patient's speech garbled, inverted, or filled with complete but inaccurate words? Does difficulty with grammar exist to the extent either of total lack or of confusion of connective words? To what extent is thought organization affected? Also, such compensatory procedures devised by the patient as tendencies to perseveration, stereotyped phrases, and clichés or automatic speech, as well as his ability to gesture, are carefully noted, as are the patient's reactions to his mistakes and his emotional stress.

*Expressive: Writing.*—The visually expressive area is investigated. Switch of handedness is frequently the problem, but determinations are also made of whether the patient can copy designs and letters, write words or sentences from dictation as well as spontaneously, and spell correctly. Frequently, similar mistakes in talking and writing are noted.

## Prognosis

On the basis of this careful language screening process, rehabilitation goals can be established and a training program determined. Although frequently tentative, these are arrived at through a cautious,

subjective evaluation of the patient and his reactions, with consideration of his premorbid personality factors and of the medical diagnosis and prognosis.

These goals should be guided by the patient's functional language ability, and should be thought of in terms of (1) basic communication, (2) home adequacy, (3) social acceptability, and (4) vocational adequacy.

*Basic Communication.*—When the patient is unable to perform high-level functional activities in any language modality, efforts are directed toward establishing the basic means of communication, such as writing, signs, and gestures.

*Home Adequacy.*—Some patients can function in their homes. These have sufficient ability to make their daily wants known and to carry out what are known as the activities of daily living, including managing the telephone, writing their names, and understanding signs.

*Social Acceptibility.*—Patients with adequate language ability may be able to function in a social environment with intelligent and understandable speech, although minor difficulties are present in the modality areas of reading and writing.

*Vocational Adequacy.*—It is felt that, with training, some patients would be considered to have adequate enough capacity to qualify for vocational placement, either in former or in new employment.

There are few patients who cannot be helped through a therapeutic program. These are the patients in whom there is severe involvement in all areas of language or in whom generalized brain damage exists.

## Treatment

The treatment program is divided into both individual and group therapy sessions and includes both definitive and multistimuli procedures. The therapeutic procedures are carried out in the speech and hearing units as well as such other departments within the rehabilitation center in which the patient will receive his treatment as the nursing, physical therapy, social service, and occupational therapy units.

The aphasia therapist is usually the one most familiar with the problems peculiar to the aphasic patient; therefore, he should assume the leadership in helping other members of the rehabilitation team to understand the patient and coordinate the treatment program.

Aphasia involves more than a language problem; it includes the necessity for adjustment in many areas. Some symptoms may be due not to actual brain damage but rather to the patient's idea of "self" and his status in life. The opportunity obtained from training in the nursing or occupational therapy units in carrying out procedures of the activities of daily living provides, in many instances, the first step to independent living and the regaining of self-respect.

Morale building is the constant concern of all therapies, and records are made and kept of the patient's progress since he is apt to lose sight of it. Recordings of the patient's own speech, made at various intervals, are good indicators of progress and have been found helpful and encouraging to the patient. The objectives of the training program are based on the small and gradual increments of improvement. In this way a greater sense of achievement may be developed in the patient.

An aphasic patient needs strong stimuli, regardless of which areas of language are affected. The aphasia therapist first establishes areas of difficulty and impairment and, in individual sessions, works with the most basic ones. Size, sound, color, and clarity of material must all be accentuated. Language associations must be enriched and the patient guided to use areas of language which are still intact in order to help the more deficient ones. Specific techniques are adapted to suit the individual patient, which again makes the program more emotionally motivating and concrete; for instance, automobile salesmen might have speech therapy based on automobiles and their parts and including naming, reading, writing, and figuring.

Group sessions have provided a most valuable technique in helping the patient to adjust to his new status. Association with others who are similarly afflicted and seeing more severe problems and also well-motivated patients does much to help the more recently afflicted, depressed patient. A spirit of competition and *esprit de corps* often results from such group activity and does much to stimulate, relax, and support the patient. It has been found that an aphasic patient will make a greater attempt to communicate with someone having a similar disability than he will with those who have normal speech. Anxiety and frustration become markedly reduced. Group activities may consist of choral singing, outings, language games, and group discussions.

Within a comprehensive rehabilitation center, the occupational therapy units may operate the same way as the speech unit (using individual as well as group sessions) and assist in carrying out the individual specific procedures outlined by the speech therapist. Many aphasic patients are hemiplegic, and changing of dominance in upper extremity function is necessary for performance of one-handed procedures in the activities of daily living and for prewriting training.

Occupational therapy can also aid morale and acceptance of disability through creative work despite language loss. Marked psychological, as well as practical, stimulation can be provided

through enabling the patient to work with familiar tools and equipment, using them in this instance, however, in a controlled environment. An excellent example of this multistimuli situation is that of housewives with aphasic problems working together in a kitchen. Such a facility as an occupational therapy workshop also provides the individual with an outlet, through physical activity, for the many frustrations that occur to him throughout his day because of his lack of complete understanding or expression.

Most difficult is the job of bridging the gap between the sheltered, protected family and rehabilitation center environments and the world outside. Here, too, part of the rehabilitation goal is to provide an opportunity for outings, picnics, and theater and restaurant parties. Once this seemingly insurmountable hurdle is crossed, with assistance, these patients and their families frequently can carry on by themselves.

A most important phase of the treatment program is the family group session. This provides an excellent opportunity for orientation and education in a most baffling problem for those closest to the patient. It has been found helpful to conduct group sessions in a nondirective way (after an explanatory film on aphasia), with members of the rehabilitation team present to answer any questions pertaining to the patient and his disability. The families of these patients also are in need of support and guidance and receive this both from the therapeutic team and from association with other families facing similar distress. This helps them to adopt a more constructive approach to the handling of these patients and aids them in understanding their share of responsibility in the long-range rehabilitation program.


## Summary

The therapeutic program for the aphasic patient involves a setting in a comprehensive rehabilitation unit. Emphasis is on retraining and rehabilitation of the whole patient, and criteria for diagnosis, prognosis, and the setting of rehabilitation goals derive from the consideration of the patient's capacity in all spheres of activity.


24 Fulton St., Newark 2, N. J. (Dr. Hoerner).

### References


1. Abramson, A.: Personal communication to the authors.
2. Kessler, H. H.: Principles and Practices of Rehabilitation, Philadelphia, Lea & Febiger, 1950. Reference 1.
3. Schuell, H.: Diagnosis and Prognosis in Aphasia, A. M. A. Arch. Neurol. & Psychiat. 74:308-315 (Sept.) 1955.
4. Marks, M.; Taylor, M.; and Rusk, H. A.: Rehabilitation of Aphasic Patient, Survey of Three Years' Experience in Rehabilitation Setting, Arch. Phys. Med. 38:219-226.


V 16
1958

---

**NITROGEN MUSTARD IN LUNG CANCER.**—In our experience with more than 1,000 patients with inoperable lung cancer, radiation therapy has provided temporary relief from distress and disability in the majority of the cases thus treated. . . . When radiation therapy became unfeasible or ineffective in the inexorable course of the disease, we found $HN_2$ to be the only truly helpful chemical agent, especially in anaplastic tumors. Since 1947, we have employed this alkylating compound in more than 150 patients with widely generalized disease, radiation resistance (initial or acquired), exhaustion of radiation tolerance of skin or lung, intractable radiation sickness, and superior vena cava obstruction syndrome. A full course of radiation therapy became possible in patients whose condition before $HN_2$ treatment precluded any consideration for the use of more effective ionizing radiation. Subjective benefits, observed in about two-thirds of the cases, consist in temporary relief from pain, cough, dyspnea, fever and hemoptysis. Objective results, seen in about one-third of the cases, include decrease in size of pulmonary and metastatic lesions, resorption of pleural fluid, re-aeration of atelectatic lung, decrease in neurological signs, and improvement of the superior vena caval obstructive phenomena. Remissions range in duration from one to seventeen weeks, averaging three and a half weeks, after a course of $HN_2$. . . . Dose levels of 0.4 mg. per kilogram of body weight per course are employed in one, two, or four fractions, injected directly into the tubing of a running infusion. This course should not be repeated in less than four weeks, to allow for complete recovery of the bone marrow. Nitrogen mustard is a polyfunctional alkylating agent with a high degree of toxicity for the cytoplasm and nucleus of rapidly proliferating cells. It promptly inhibits a variety of cellular enzymes, interfering with such vital metabolic processes as cellular respiration. The pulmonary vascular bed is the first capillary bed traversed after intravenous injection, and hence a higher concentration of the drug is fixed in pulmonary tissues than in more peripheral areas. This may explain the fact that bronchial cancer is the only epithelial tumor significantly affected by the intravenous injection of $HN_2$.—B. Roswit, M.D., Present Status of Chemotherapy of Bronchial Cancer, *Radiology*, October, 1957.

# ABNORMALITIES OF CALCIUM METABOLISM IN PATIENTS WITH "IDIOPATHIC" URINARY CALCULI

## EFFECT OF ORAL ADMINISTRATION OF SODIUM PHYTATE

William H. Boyce, M.D., Fred K. Garvey, M.D.
and
Carol E. Goven, B.S., Winston-Salem, N. C.

*The daily urinary excretion of calcium in 148 patients with urinary calculi was compared with that in 37 healthy people who had no personal or familial history of such calculi. Patients under home-life conditions on self-selected diets did not differ from healthy subjects as to dietary calcium intake, yet their average urinary calcium output was significantly higher. The effectiveness of sodium phytate in hindering the absorption of calcium from the intestine was studied by comparing the urinary calcium excretion of 104 patients who received phytate with that of 74 subjects who did not; the oral administration of sodium phytate in doses of 125-175 mg. per kilogram of body weight per day caused a distinct and sustained reduction of urinary calcium. Regression or disappearance of existing calcified stones was never observed, and no convincing evidence was obtained as to the efficiency of low-calcium diet and orally administered phytate in preventing stone formation. The complexity of the factors involved in stone formation is illustrated in five case histories. The data indicate, however, that individual differences and derangements of calcium metabolism exist, that a regimen of low-calcium, low-vitamin D intake with sodium phytate by mouth sometimes affords helpful diagnostic clues, and that this regimen has possibilities in both the preoperative and the postoperative care of patients with urinary calculi.*

All urinary calculi are composed of an organic matrix (2.5%) and an inorganic crystalline body (97.5%). The latter is calcigerous in 90 to 95% of patients. Many disturbances of calcium metabolism are associated with an increased incidence of renal calculi, but fully 95% of stones are "idiopathic."[1] With the exception of a series of studies by Flocks,[2] there has been no systematic investigation of the urinary excretion of calcium in this class of patients. In 1952, a laboratory devoted exclusively to the study of patients with renal calculi was established at the Bowman Gray School of Medicine. In addition to the routine diagnostic tests and short-term calcium balance studies, there gradually emerged a series of programs designed to reduce the oral intake and intestinal absorption of calcium by patients with idiopathic hypercalciuria. These regimens progressed through three stages: (1) a 300-mg. calcium, low-vitamin D, high-phytate diet, from January, 1953, until June, 1954; (2) a 150-mg. calcium, low-vitamin D, high-phytate diet from June, 1954, until the present, and (3) the 150-mg. calcium diet, to which orally given sodium phytate was added in June, 1955, continuing until the present.

An average of 130 new patients have been examined yearly, but only 148, in whom calculi have formed on more than one occasion, are included in the present report. The criteria for selection (exclusion) of subjects are acceptable only because it is impossible to predict the formation of calculi; hence, one cannot define the "calculus disease patient" before the fact of stone formation has been established. The disease is characterized by periods of exacerbation and remission of stone growth with intercurrent attacks of urinary infection, renal colic, nausea, vomiting, and all degrees of renal parenchymal disease. The selection of control and test subjects from such a variable population is impossible in the present state of our knowledge. It is possible to obtain some meaningful data by comparing patients who have repeatedly formed calculi with subjects who have never formed stones or had any clinical evidence of urinary tract disease, and to this end the selection of subjects was made.

From the Department of Urology, Division of Surgery, Bowman Gray School of Medicine of Wake Forest College.

Read before the Section on Urology at the 106th Annual Meeting of the American Medical Association, New York, June 6, 1957.

### Subjects

The normal subjects were 37 members of the student body and faculty at the school of medicine who had never formed urinary calculi, had no familial history of calculi, and were considered to be in good health.

Patients for the study were selected from those who had had more than one episode of calcigerous renal (ureteral) calculus formation, whose calculi had been analyzed in the laboratory, and who had been under observation for more than three years.

These were categorized into group 1 (active) or group 2 (passive) on the basis of a survey conducted between May and September, 1954. Group 1 was composed of 60 patients who had formed new calculi or shown roentgenographic evidence of

TABLE 1.—*Composition of Dietary Regimens Used in Study of Patients with Urinary Calculi*

| Diet | Protein, Gm. | Fat, Gm. | Carbohydrate, Gm. | Phosphorus, Gm. | Calcium, Gm. | Calories |
|---|---|---|---|---|---|---|
| 1. High calcium, high protein | 125 | 100 | 400 | 2.10 | 1.800 | 2,900 |
| 2. Control | 87 | 87 | 367 | 1.30 | 0.750 | 2,350 |
| 3. High phytate, low vitamin D, 300 mg. calcium | 80 | 100 | 250 | 1.25 | 0.300 | 2,300 |
| 4. High phytate, 10 mg. vitamin D, 150 mg. calcium | 58 | 85 | 221 | 1.05 | 0.150 | 1,900 |

increase in the size of existing stones within the preceding year. Group 2 was composed of 88 patients who had formed no calculi within this period. Many patients in this latter group had been followed for much longer periods of time, and some had hospital records and roentgenograms available for periods up to 16 years. In all 148 patients urinary calcium and phosphorus determinations had been made 2 to 12 times monthly with roentgenograms at intervals of 3 to 6 months, and all had been on the 300-mg. calcium diet (diet 3, see table 1) for 3 to 18 months. Forty-three (29%) had had calculi in both kidneys, but none had clinical evidence of impairment of renal function or of metabolic disease by previously reported criteria.[1] All were able to concentrate the urine to a specific gravity of more than 1.026; urograms revealed no

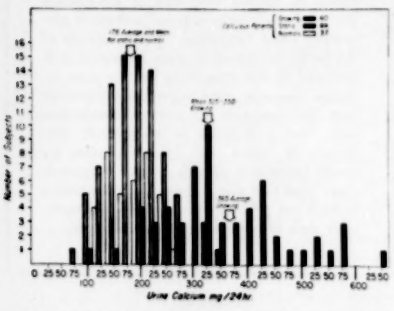



Fig. 1.—Urinary excretion of calcium by patients with calculi and by normal subjects during usual physical activity. Self-selected diets included calcium intake of 1,000 mg. (±200).

hydronephrosis or anatomic abnormalities sufficient to warrant surgical correction. Serum calcium, phosphorus, and alkaline phosphatase concentrations were within normal range. Roentgenographic survey of the skull, teeth (lamina), hands, feet, chest, and abdomen revealed no evidence of bone disease or vicarious calcification of soft tissues. Urine cultures were sterile in 38% of the patients, 14% had infection with Proteus organisms, and a variety of organisms were recovered from the remainder. Seventy-seven (52%) were men whose average age was 36 years (range, 19-78 years), and 71 (48%) were women of 41 years average age (range, 22-64 years). Between May and September, 1954, equal numbers of patients in each group were placed either on the 150-mg. calcium diet (diet 4) or on the control regimen (diet 2). An attempt was made to match the control and test groups with respect to the above characteristics. At the time the study began, calculi were present in the urinary tracts of 42 (55%) of the men and in 36 (51%) of the women. During the course of study, calculi were removed only if obstruction or infection made operation mandatory. Calculi were passed spontaneously or removed at operation in 42 patients, and 36 subjects retained their calculi for the entire study period.

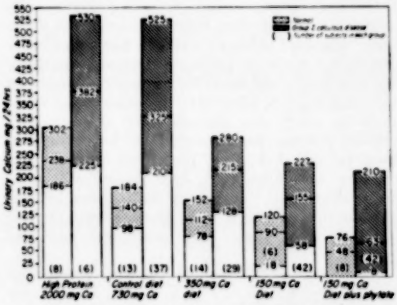



Fig. 2.—Urinary excretion of calcium by patients with actively forming calculi and by normal subjects after 14 days of various controlled dietary regimens. Shaded area of each bar covers the range of urinary calcium concentrations. Central figure in the shaded area is median value of each group.

## Methods

*Dietary Regimens (table 1).*—The dietary programs were prepared by the special diets section of the department of dietetics, whose members instructed the patients with regard to the dietary program at the initiation of the study and during subsequent visits to the outpatient department.

*Sodium Phytate.*—The dry powder of sodium phytate (Rencal) was obtained as the neutral salt of sodium inositol hexaphosphate. Phytate solution was prepared by dissolving 450 Gm. of sodium phytate powder in 450 cc. of distilled water, 300 cc. of glycerin, and 6 Gm. of sodium benzoate and by cooling. After complete solution, cherry syrup was added to give a total volume of 3,000 cc. The so-

V 16
1958

lution of sodium phytate contained 15% (W/V) of the dry powder, and the initial dosage per 24 hours was 125 mg. of phytate per kilogram of body weight in three divided doses. This was gradually increased, as tolerated by the patient, until the urinary calcium excretion was reduced to 50 mg. in 24 hours or a maximum dose of 200 mg. per kilogram of body weight in 24 hours was reached. In the event that diarrhea or soft bowel movements developed in the initial stages of treatment, dosage was reduced by the patient to a point where no diarrhea occurred. After one week, the dosage was gradually increased to the original prescription.

*Urinalysis.*—Each patient was given a detailed explanation of the regimen and a mimeographed sheet of instructions for collection of exact 24-hour urine specimens. Urinary calcium [3] and phosphorus [4] determinations were by standard techniques.

*Study Program.* — A study period consisted of three consecutive days on which 24-hour urine specimens were collected; results were averaged into one value for the purpose of recording data. A minimum of three study periods at weekly intervals were obtained before and immediately after any change in a dietary program. Subsequent study periods were gradually increased to intervals of three to four weeks, depending on the progress of the patient. Patients who were seen in an acute attack of renal colic, pyelonephritis, or hematuria were treated by the methods previously outlined.[1] No urinalyses obtained during this time were included in the present data. After complete recovery from the acute episode, the patient was returned to the study series.

## Results

*Normal Subjects.*—Figure 1 illustrates the "pretreatment" studies of normal persons and patients with calculous disease on self-selected diets. All values are derived from specimens submitted on an outpatient basis and represent urinary calcium excretion under home-life conditions of usual activity and diet. Calcium intake estimated from diet lists submitted by the subjects was within the range of 1,000, plus or minus 200 mg., per 24 hours. No significant dietary variation between the three groups could be detected from these diet lists. The results of variations of calcium intake of the 37 normal subjects are summarized in figure 2.

*Patients with Calculous Disease.*—The mean calcium excretion of the subjects in group 1 was much greater than either group 2 or normal subjects (fig. 1). The range was also greater not only between members in group 1 but also in period-to-period calcium excretion by the individual subjects. The response of these patients in group 1 to the various dietary regimens is illustrated in figure 2. In all of these illustrations, a minimum of three study periods (nine urine specimens) were averaged as the mean calcium excretion for each individual.

*Response to Orally Given Sodium Phytate and the 150-Mg. Calcium Diet (Diet 4).*—Subjects were followed for 3 to 18 months on dietary program 3

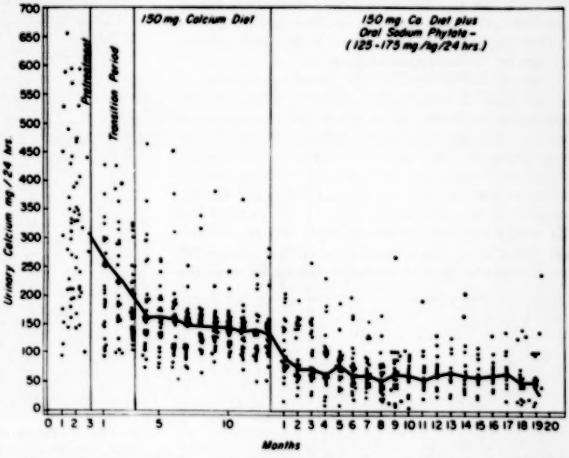



Fig. 3.—Urinary calcium excretion of 19 patients in group 1 (active) and 18 in group 2 (static) on dietary program 4. Each dot is the average of three 24-hour urinary calcium determinations. Solid line is the median value for all subjects examined. No calcified stone formation occurred in these patients.

prior to beginning program 4. As illustrated in figure 2, patients in group 1 showed much less response to this degree of calcium restriction than did either the normal or the group 2 patients. The individual subjects showed marked fluctuation from study to study, covering the entire range of the variation shown in figure 3. The stability of the mean values on this graph is, therefore, a group response and not typical of the individuals.

Eighteen of 104 patients who were placed on phytate therapy have, at the time of writing, failed to show a satisfactory response to the medication for a variety of reasons. Seven of this group ad-

mitted that they were not taking the full dose of phytate because of five to eight soft bowel movements per day. One patient was subsequently found to have an adenoma of the parathyroid gland. One patient who was taking a commercial vitamin preparation which provided 20,000 units of vitamin D daily responded promptly to phytate when the vitamin therapy was discontinued. Five patients stated that they were taking the maximum dose, but three of these were admitted to the hospital for supervised study and showed a prompt reduction in urinary calcium to less than 120 mg. per 24 hours when the dietary intake and medications were carefully supervised. Thus, we have not demonstrated any patient with idiopathic hypercalciuria to be refractory to the sodium phytate, low-calcium diet if it is followed. In the course of our study, there has been no evidence that any patient who responded satisfactorily has become refractory to sodium phytate or has adapted to the low-calcium routine by an increased absorption.

*Control Subjects.*—The 74 control subjects received diet 2 and were given a dose of one tablespoonful three times daily of the syrup of cherry, glycerin, and water base without the sodium phytate. The mean calcium excretion for the 52 patients who were successfully followed ranged between 250 and 350 mg. per 24 hours for the entire period of observation (fig. 4). The range was 125 to 470 mg. per 24 hours, with 82% of individuals showing a mean calcium excretion above 225 mg. These results thus compare favorably with the

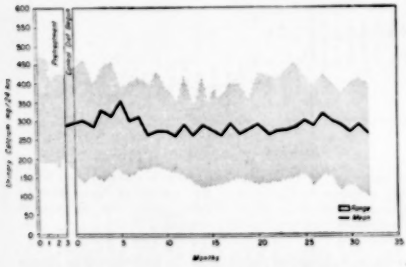


Fig. 4.—Urinary calcium excretion of 30 patients in group 1 and 22 in group 2 on control dietary program no. 2. Solid line is median value for all subjects examined. Fourteen patients formed 38 new calculi and/or increased the size of 6 preexisting calculi during the 32 months of observation.

pretreatment studies and indicate that the reduction in calcium excretion illustrated in figure 3 is indeed due to the restricted calcium intake plus sodium phytate.

*Calculus Formation.*—No valid conclusions as to the efficacy of the low-calcium and oral phytate regimen in the prevention of stone formation can be drawn from the present data, because the many variables do not permit a precise definition of the disease and the categories from this point of view are statistically unsound. It was of interest that no patient showed any regression or disappearance of existing calcified stone in any of the study groups. Five patients on the low-calcium routine who showed good response, as illustrated by mean calcium excretion of 35 mg. per 24 hours, formed calculi composed largely of "matrix material" [5] (fig. 5). These "calculi" were nonopaque to ordi-

Fig. 5.—Preoperative pyelogram of renal pelvis containing roentgenolucent "matrix calculus." Specimen (insert) removed at operation contained 28% inorganic ash. Patient had had pyelolithotomy for roentgenopaque calcium phosphate calculus prior to institution of dietary program no. 4, during which the matrix calculus formed.

nary roentgenography but were found to contain 20 to 50% of inorganic ash. No such "uncalcified stones" were found in the control group. Furthermore, six other patients who were not included in the present study have also been found to form these uncalcified or matrix type of stones. A total of 11 patients have thus been observed with stones of low crystalline content, and the mean calcium excretion of 10 of these patients was 36 mg. per 24 hours with a range of 8 to 70 mg. In the one additional patient whose urinary calcium excretion was 110 to 150 mg. per 24 hours, collection of differential urine specimens revealed a calcium concentration of 4 mg. per 100 ml. from the kidney contain-

ing the matrix stone and 16 mg. per 100 ml. from the kidney containing no stone, although urine volume was greater from the kidney containing the stone. The incidence of stone formation is summarized in table 2.

TABLE 2.—*Incidence of Stone Formation*

| | Patient Classification | | Calculus Formation, No. | | | |
|---|---|---|---|---|---|---|
| | Group 1 (Active), No. | Group 2 (Static), No. | Total | Calcified | Matrix | Total |
| 150 mg. Ca. + phytate | 21 | 18 | 42 | 5 | 5 | 10 |
| Control, 750 mg. Ca. | 30 | 22 | 52 | 14 | 0 | 14 |
| Lost to follow-up | 6 | 48 | 54 | ... | ... | ... |

Calcigerous stone formation occurred in five patients, initially group 1 patients, while they were on the low-calcium and oral sodium phytate regimen. These were not included in figure 3, but the urinary calcium excretion is shown in figure 6.

## Report of Cases

CASE 1.—A 44-year-old man had formed small calcium oxalate stones repeatedly for a period of 12 years. He had had one pyelolithotomy and, at the time the study began, had multiple small calculi in both kidneys. X-ray studies were made over a three-month period, during which time he was under observation for possible parathyroid adenoma or metabolic disease. During this time he maintained a urinary calcium excretion level consistently above 300 mg. per 24 hours, but there was no increase in the size of existing calculi or any new stone formation. During the pretreatment period he was admitted to the hospital for complete balance studies. No definite biochemical or roentgenographic evidence of parathyroid or other disease was found. He was started on the sodium phytate therapy in a dosage of 125 mg. per kilogram of body weight per 24 hours, with the response illustrated in figure 6. He had some diarrhea with this dosage and had not shown a completely satisfactory response at the time that his first follow-up x-ray was made. The formation of a large stone in the left kidney had undoubtedly occurred since the beginning of the phytate treatment. The phytate dosage was increased to 200 mg. per kilogram of body weight per 24 hours. The calculus passed into the middle third of the left ureter where it became fixed, and was removed by ureterolithotomy. Readmission to the hospital with repeat study was done. Response to the intravenous calcium test[6] revealed an elevation of the serum phosphorus level by only 0.6 mg. per 100 ml. as compared with a serum calcium elevation from a concentration of 11 to 14.6 mg. per 100 ml. A phosphate deprivation test was carried out, and the tubular reabsorption of phosphate[7] was found to be 67%. Exploration was done on April 23, 1957, and a large parathyroid adenoma was removed.

CASE 2 and CASE 3.—These patients were two women, aged 32 and 38 years respectively. Each had experienced repeated formation of calculi in both kidneys since the ages of 16 and 24. It was of interest that routine urine specimens submitted prior to the onset of renal colic showed a marked rise in urinary calcium excretion. The attack of renal colic occurred at the points illustrated by the symbols for diagnostic x-ray in figure 4. Both patients admitted that they had abandoned their diets and partially discontinued the phytate medication during the period prior to stone formation. After removal of the calculi, each showed a satisfactory response to therapy and no subsequent formation of calculi.

CASE 4.—A 48-year-old man has been seen at this hospital since the age of 24 years with recurrent bilateral calcium phosphate stones. A total of 14 operations, 6 pyelolithotomies and 8 ureterolithotomies, had been done with many cystoscopic extractions of calculi. Proteus mirabilis and P. rettgerii were resistant to all available therapy. At the time of introduction of the low-phytate routine, the patient had no calculi in the urinary tract. He then formed roentgenolucent matrix calculi which blocked the renal pelves and required bilateral nephrostomy. Eight months after nephrostomies were established, he formed a large calcified stone in one renal pelvis, and, since this is nonobstructing, no operative procedure has been done.

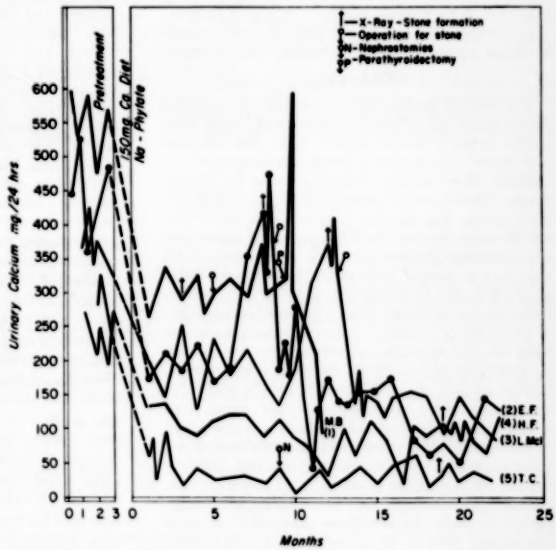



Fig. 6.—Urinary calcium excretion of five group 1 patients who formed calcigerous stones while on dietary program no. 4. Patient in case 1 responded to program after removal of parathyroid adenoma. Patients in cases 2 and 3 abandoned program before calculus formation occurred. In patient in case 4 the size of existing urinary calculus increased, and in that in case 5 new calculus formed in spite of persistently low urinary calcium excretion.

Case 5.—A 34-year-old woman had had bilateral operation for correction of a horseshoe kidney and repeated bilateral calculus formation for a period of 16 years. She had positive urine cultures for P. rettgerii and had nonobstructing calculi in both kidneys at the time this study was begun. In the period between Dec. 4, 1953, and March 10, 1956, the stone in the right kidney was found by roentgenography to be increased to approximately three times the previous width, although urinary calcium excretion had been consistently low. No increase was noted in the size of the stone in the left kidney. This patient and that in case 4 have been repeatedly examined for biochemical or roentgenographic evidence of parathyroid or metabolic disease, with consistently negative results.

These brief histories indicate that calculus formation in three of the above patients cannot be attributed to failure of the phytate regimen, since one had a parathyroid adenoma and two failed to remain on the program. Of the two remaining patients, both had bilateral renal pelvic and calyceal dilatation with Proteus infection. It is a moot question whether the rate or rapidity of stone growth in these patients was influenced by the program.

## Comment

The present studies have confirmed the previous observations by Flocks [9] that patients with idiopathic urinary calculi absorb from the intestine and excrete in the urine a much greater quantity of calcium than persons who have never formed stones. Flocks also observed that an increased calcium intake, high-protein diet, and exogenous vitamin D markedly increased absorption of calcium in stone-forming patients and to a much greater degree than in normal individuals. As in Flocks' series of studies, we have been unable to demonstrate bone disease in these patients by roentgenographic or biochemical studies, nor has demineralization of bone become apparent, although the patients were on restricted calcium diets for two or more years. Recent studies of renal function by the clearance techniques [9] offer good evidence that impairment of renal function in calculous disease is secondary to mechanical obstruction and infection and is not a prerequisite to formation of the calculus. Thus, in the absence of either bone or renal disease a sustained hypercalciuria can be due to, and supported by, only one condition—increased intestinal absorption. This is in accord with the Neumans' first postulate [10] that some active mechanism ("ion-pump") must exist for the absorption of calcium from the gastrointestinal tract. In the patient with calculous disease, the ion-pumps exceed the apparent need for calcium. The burden of maintaining the long-term balance under these circumstances rests upon the kidneys, since the bone cannot accept the excess calcium ad infinitum and the intestine has no excretory mechanism for it.

A low calcium intake plus oral sodium phytate will reduce the intestinal absorption of calcium to less than normal levels for many months without obvious deleterious effects. This may be beneficial in the prevention of calculus formation in the urinary tract, particularly in those patients who frequently form small calcium oxalate stones. It is conceivable that the quantity of matrix material in these patients is small enough to pass without obstructing the flow of urine, provided crystal deposition can be prevented. Patients with large quantities of matrix may form roentgenographically nonopaque or uncalcified matrix stones.[11] Under certain circumstances, perhaps Proteus infections, this matrix will calcify with extremely low concentrations of urinary calcium. It should be noted that two patients who formed matrix calculi had infection with Proteus organisms; furthermore, 7 patients on the low calcium and phytate routine and 10 on the control regimen had infections due to Proteus organisms but did not form calculi.

The possible complications of long-term phytate therapy and the contraindications for its use have been carefully reviewed.[12] Demineralization of bone in patients of the type presented here is not considered a likely complication. The normal kidney can conserve calcium by reducing the urinary excretion to near zero in periods of deprivation [13]; hence, a mean urinary calcium excretion of 50 mg. per 24 hours would indicate a margin of calcium which could still be retained if it were required. Since there are 1,200 Gm. of calcium in the adult skeleton and osteoporosis is ordinarily noted by x-ray when 40% of this is depleted, a negative calcium balance of 100 mg. per day would require 13 years to produce roentgenographic changes similar to clinical "senile osteoporosis." No complications of oral phytate administration have been observed up to the present time, but these subjects were carefully selected. Patients with a history of hemorrhagic diatheses or disease which might result in blood loss (peptic ulcer) were eliminated from the study. No patient with impaired cardiac function was given sodium phytate, since the increased sodium absorption and potassium excretion might precipitate cardiac failure. Patients with advanced renal disease have not received phytate lest retention of phosphate occur. Patients were carefully screened for hyperparathyroidism and other conditions causing bone disease prior to beginning the therapy.

## Summary

Patients with "idiopathic" renal calculous disease in the active stages exhibit a significantly elevated urinary calcium excretion on diets which contain as little as 350 mg. of calcium per 24 hours. They have neither bone nor renal disease in the initial stages of calculus formation. The increased renal excretion of calcium is a result of increased intestinal absorption, and many factors (high calcium, high protein, and high vitamin D intake) greatly accelerate the calcium absorption of these patients.

V 16
1958

Hypercalciuria is not the sole etiological factor in calculus formation but is only one aspect of a metabolic derangement which has not been defined. Until such time as the entire process can be delineated it seems feasible to attempt the prevention of recurrent stone formation by reduction of calcium intake and absorption.

Sodium phytate forms an unabsorbable complex with calcium in the intestinal tract. When administered orally with a low-calcium (150 mg. per 24 hours) and low-vitamin D diet, it effectively reduces the urinary excretion of calcium to quantities unobtainable by any tolerable diet alone. No complications from or adaptations (resistance) to the low-calcium and oral sodium phytate routine have been observed in patients who have been followed for more than two years. In selected patients who are carefully followed, this program appears to be relatively safe and generally beneficial in the prevention of urinary calculus formation. It may not be without danger to the patient with advanced renal disease, bone disease, heart disease, hemorrhagic diatheses, or hematopoietic disease. Neither will it prevent stone formation in every patient who has a calcifiable matrix in the urine, particularly in the presence of infection with Proteus organisms.

The low-calcium, low-vitamin D, and oral sodium phytate regimen appears to be of value in (1) differentiation of idiopathic hypercalciuria from metabolic or bone disease, (2) preoperative preparation of patients with renal calculi (particularly of the large "staghorn" variety), and (3) postoperative prevention of recurrent calculus formation.

This investigation was supported by a research grant from the National Institute of Arthritis and Metabolic Diseases of the National Institutes of Health, Department of Health, Education and Welfare, and by grants-in-aid from the Mary Reynolds Babcock Foundation and from the Squibb Institute for Medical Research.

The sodium phytate powder used in this study was obtained as Rencal through the courtesy of Dr. Douglas B. Remsen of the Squibb Institute for Medical Research, E. R. Squibb & Sons, Division of Olin Mathieson Chemical Corporation, New York.

## References

1. Garvey, F. K., and Boyce, W. H.: Diagnostic and Therapeutic Problems Incident to Surgical Treatment of "Malignant" Renal Calculous Disease, J. Internat. Coll. Surgeons **23**:310-326 (March) 1956.

2. Flocks, R. H.: (*a*) Calcium Urolithiasis: Role of Calcium Metabolism in Pathogenesis and Treatment of Calcium Urolithiasis, J. Urol. **43**:214-233 (Jan.) 1940; (*b*) Prophylaxis and Medical Management of Calcium Urolithiasis: Role of Quantity and Precipitability of Urinary Calcium, ibid. **44**:183-190 (Aug.) 1940; (*c*) Calcium and Phosphorus Excretion in Urine of Patients with Renal or Ureteral Calculi, J. A. M. A. **113**:1466-1471 (Oct. 14) 1939.

3. Wang, C. C.: Improvements in Methods for Calcium Determination in Biological Material, J. Biol. Chem. **111**:443-454 (Oct.) 1935.

4. Fiske, C. H., and Subbarrow, Y.: Colorimetric Determination of Phosphorus, J. Biol. Chem. **66**:375-400 (Dec.) 1925.

5. Boyce, W. H., and Garvey, F. K.: Amount and Nature of Organic Matrix of Urinary Calculi: Review, J. Urol. **76**:213-227 (Sept.) 1956.

6. Howard, J. E.; Hopkins, T. R.; and Connor, T. B.: Use of Intravenous Calcium as Measure of Activity of Parathyroid Glands, Tr. A. Am. Physicians **65**:351-358, 1952.

7. Chambers, E. K.; Gordan, G. S.; Goldman, L.; and Reifenstein, E. C., Jr.: Tests for Hyperparathyroidism: Tubular Reabsorption of Phosphate, Phosphate Deprivation and Calcium Infusion, J. Clin. Endocrinol. **16**:1507-1521 (Nov.) 1956.

8. Reference 2*a* and *c*.

9. Michie, A. J., and Michie, C. R.: Kidney Function in Unilateral Pyelonephritis: I. Clinical Data, Am. J. Med. **22**:179-189 (Feb.) 1957.

10. Neuman, W. F., and Neuman, M. W.: Seminar on Bone Diseases: Emerging Concepts of Structure and Metabolic Functions of Bone, Am. J. Med. **22**:123-131 (Jan.) 1957.

11. Boyce, W. H., and Sulkin, N. M.: Biocolloids of Urine in Health and in Calculous Disease: III. Mucoprotein Matrix of Urinary Calculi, J. Clin. Invest. **35**:1067-1079 (Oct.) 1956.

12. Henneman, P. H.; Carroll, E. L.; and Albright, F.: Suppression of Urinary Calcium and Magnesium by Oral Sodium Phytate: Preliminary Report, Ann. New York Acad. Sc. **64**:343-350 (Aug. 17) 1956. Henneman, P. H.; Dempsey, E. F.; Carroll, E. L.; and Albright, F.: Cause of Hypercalciuria in Sarcoid and Its Treatment with Cortisone and Sodium Phytate, J. Clin. Invest. **35**:1229-1242 (Nov.) 1956.

13. Brine, C. L., and Johnston, F. A.: Factors Affecting Calcium Absorption by Adults, J. Am. Dietet. A. **31**:883-888 (Sept.) 1955.

---

**CHRONIC DISSEMINATED TUBERCULOSIS.**—Chronic disseminated tuberculosis is a prolonged disease which involves several organs of the body. It is not easily recognized. Any person with prolonged undiagnosed fever, weight loss and positive tuberculin deserves a trial with anti-tuberculosis drugs. Eleven cases are presented to illustrate the multiple organ involvement in chronic disseminated tuberculosis and the results obtained with antituberculosis drugs. Treatment of this disease must be generalized and prolonged. Residuals in involved organs after prolonged drug administration should be treated by procedures recommended by appropriate experts.—Col. E. A. Cleve, M. C., U. S. Army, R. V. Young, M.D., and Amadeo Vicente-Mastellari, M.D., Chronic Disseminated Tuberculosis, *Diseases of the Chest*, December, 1957.

# REHABILITATION OF PERSONS WITH BILATERAL AMPUTATION OF LOWER EXTREMITIES

Arthur L. Watkins, M.D.
and
Sung J. Liao, M.D., Boston

*The effectiveness of a program of rehabilitation was studied in 50 patients with bilateral amputation of lower extremities. The average age was 55 years and the reason for amputation was peripheral vascular disease in 34 cases. The rehabilitation program included preprosthetic training, instructions in activities of daily living, prevocational evaluation and guidance, and job placement when indicated. Failures were explained only in part by the presence of severe medical complications. Age, primary etiology, and site of amputation were found, by systematic analysis, to have no direct bearing on the likelihood that a given patient would become self-sufficient. Motivation appeared to be a contributing factor. Thirty-five patients were considered rehabilitated, and 16 of these became economically independent.*

The loss of both lower extremities through amputation represents one of the severest physical handicaps, particularly as it occurs most commonly in the older age group. During the last six and one-half years, from May, 1950, through December, 1956, over 500 persons with amputation of a lower extremity were admitted to the Bay State Medical Rehabilitation Clinic. Of these, 10% had bilateral amputations, and the present study deals with the end-results of rehabilitation in this group of patients. Of these 54 patients, 50 completed appropriate treatments and have been followed up for end-results.

## Case Material

*Age and Etiology.*—The average age of the 50 patients was 55. Of these, 41 were men, with an average age of 56, and 9 were women, with an average age of 52. As might be expected in this age group, etiology was most commonly that of peripheral vascular disease, usually arteriosclerosis, although a few cases of thromboangiitis obliterans were included. In 29 men, with an average age of 60, and 5 women, with an average age of 65, the etiology was peripheral vascular disease. The average age of these 34 patients was 61 years. In 12 men, with an average age of 46, and 4 women, with an average age of 38, the etiology was trauma and miscellaneous causes. The average age of these 16 patients was 43 years. The primary etiological causes of amputation were arteriosclerosis, 60%; diabetes mellitus, 38%; thromboangiitis obliterans, 8%; trauma, 25%; and miscellaneous, 6%.

*Site of Amputation.*—There were 31 patients, with an average age of 59, who had bilateral amputations above the knee, and 8, with an average age of 48, who had bilateral amputations below the knee. Eleven patients, with an average age of 52, had one amputation above and one below the knee. Table 1 shows the relationship between site of amputation and the etiology.

*Training in Use of Prostheses.*—The amputees were given training in the use of prostheses in our clinic. The patients with amputations above the knee started with bilateral pylons or short nonarticulated prostheses for training purposes and later used long standard above-knee prostheses. As the artificial limbs were often prescribed elsewhere, we did not have control of this entirely, and so some patients started immediately with bilateral long limbs. The number of visits required for training indicates that the longer the prostheses the greater the number of training periods necessitated. The 21 patients who used bilateral pylons required an average of 16 visits, the 10 who used bilateral above-knee prostheses required 31, the 10 who used one above-knee and one below-knee prostheses required 27, and the 8 who used bilateral below-knee prostheses required 21 visits for training purposes.

*Rehabilitation Results.*—A grading table was used to measure degree of rehabilitation. Those persons in grades A and B (table 2) were considered to be successfully rehabilitated from an economic point of view. Those in grades C and D were considered rehabilitated, although not employed—usually because of age and general physical condition. The failures in rehabilitation received grades E, F, and G. From the tabulation of end-results, it can be seen that 30% of the patients became economically independent and that 70% were considered rehabilitated. Fifteen patients, or 30% were considered failures.

Medical Director, Bay State Rehabilitation Clinic, and Assistant Clinical Professor of Medicine, Harvard Medical School (Dr. Watkins). Clinical Fellow in Physical Medicine, Massachusetts General Hospital (Dr. Liao). Dr. Liao is now Assistant Chief of Physical Medicine and Rehabilitation, State of Connecticut Commission on Chronically Ill, Rocky Hill Hospital Unit, Rocky Hill, Conn.

Read before the Section on Physical Medicine at the 106th Annual Meeting of the American Medical Association, New York, June 5, 1957.

The relationship between end-result and age is noted in table 3 and the relationship between end-result and site of amputation in table 4. It is, perhaps, surprising to note the number of successful rehabilitations among the older age groups and also in those with bilateral above-knee amputation sites. As would be expected, there were successes and failures in both the group with peripheral vascular disease and the group with trauma and miscellaneous ailments. There were 23 successes and 11 failures in the former group and 12 successes and 4 failures in the latter. This indicates that some factor other than age, etiology, or site of amputation determines the end-results as far as rehabilitation is concerned.

Some thought was given to the idea that perhaps the interval of time between operation and rehabilitation was the determining factor. There were 24 successes and 8 failures in the group for whom the interval of time between operation and rehabilitation was less than 1 year, 9 successes and 4 failures when the interval was 2 to 5 years, and 2 successes and 3 failures when the interval was 5 to 36 years. The number of successes and failures was not related to the factor of time of starting rehabilitation.

TABLE 1.—*Relationship Between Etiology and Site of Amputation*

| Etiology | Site of Amputation* | | | Total Patients |
|---|---|---|---|---|
| | AK-AK | AK-BK | BK-BK | |
| Peripheral vascular disease | 28 | 4 | 2 | 34 |
| Trauma and miscellaneous causes | 3 | 7 | 6 | 16 |
| Patients, no. | 31 | 11 | 8 | 50 |

* AK refers to amputation above and BK to amputation below the knee.

TABLE 2.—*Results of Rehabilitation Program*

| Results | Rehabilitation Grade | Patients, No. | % of Total Patients |
|---|---|---|---|
| Gainfully employed* | A | 10 | 20 |
| Homemaking; spouse employed* | B | 5 | 10 |
| Employable but not placed | C | 6 | 12 |
| Independent in activities of daily living but unemployable | D | 14 | 28 |
| Rehabilitated, total | A, B, C, D | 35 | 70 |
| Partial independence in activities of daily living and unemployable | E | 5 | 10 |
| Use of wheel chair necessary | F | 7 | 14 |
| Died during rehabilitation | G | 3 | 6 |
| Failures, total | E, F, G | 15 | 30 |

* Economically independent.

## Types of Prostheses

For training purposes for patients with bilateral amputation above the knee, training pylons are often used. These are short nonarticulated prostheses. They are constructed with willow sockets, usually for ischiatic weight bearing and with muscle contour, with pelvic band suspension, and with either a single or double swivel two-way hip joint. There are no knee joints. Occasionally ankle joints are included, with a balancing platform instead of a foot that has toes extending in reverse direction. The latest development in this type of prosthesis is the incorporation of quadrilateral socket fit, providing better control of the limb.

Long above-knee prostheses were manufactured from willow sockets of the same shape and the same suspension as those used for pylons. Standard knee joints were utilized, with the exception of an occasional case when a knee lock was necessary. In one instance a patient came to us with two temporary long limbs consisting of laced-leather thigh corsets, drop ring locks for the knees, and shoulder suspension. The patients with amputations below the knees were, with one exception, given standard below-knee prostheses. In one case, experimental suction sockets were provided and were very successful.

Analysis of our cases revealed that the factors of age, etiology, or amputation site were not the most significant factors in rehabilitation end-result, nor was the interval between surgery and prosthetic training. Because of the small numbers of patients involved, these conclusions cannot be drawn with entire satisfaction. Our experience indicates, however, that when patients were given equal opportunity for rehabilitation, success seemed most dependent on motivation. Unfortunately, this factor could not be predetermined and was not measurable except through clinical judgment.

TABLE 3.—*Rehabilitation Results According to Age of Patient*

| Age Group | Successes per Grade, No. | | | | Failures per Grade, No. | | | Total Successes | Total Failures |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | | |
| 20-30 | 1 | | | | | | | 1 | |
| 30-40 | 2 | | | | | | | 2 | |
| 40-50 | 2 | 1 | | | | 2 | | 3 | 2 |
| 50-60 | 2 | | | 1 | | | 1 | 3 | 1 |
| 60-70 | 1 | 2 | 2 | 4 | 2 | 1 | 1 | 9 | 4 |
| 70-80 | 2 | 1 | 3 | 8 | 2 | 3 | 1 | 14 | 6 |
| 80-90 | | 1 | 1 | 1 | 2 | 1 | | 3 | 2 |

## Comment

It may be emphasized that this group of patients were mostly elderly individuals, who are generally considered poor candidates for training in the use of prostheses. Sixty per cent had arteriosclerotic changes and had bilateral amputations above the knee. The amputations due to trauma were mostly below the knee or combinations of above and below and occurred in patients with a wide range of ages. In spite of these handicaps, 70% of the entire group became independent, at least in self-care, and 30% achieved economic independence. If the three patients who died during the course of rehabilitation are excluded, rehabilitation figure would be 75%.

Our rehabilitation program consisted in preprosthetic training, instructions in activities of daily living, prevocational evaluation and guidance, and, finally, job placement when indicated. Our minimal goal, in general, was self-sufficiency in self-care of the patient by using prostheses so that the family members could be free to carry on their own routine. In the younger patients, and whenever possible in others, we attempted to achieve employment as a goal. As a result of our study, we intend to prescribe prostheses and institute appropriate rehabilitation programs in the future for more patients with amputation of the lower extremities whenever they are motivated and regardless of age.

TABLE 4.—*Rehabilitation Results According to Site of Amputation*

| Location of Amputation | Successes per Grade, No. | | | | Failures per Grade, No. | | | Total Successes | Total Failures |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | | |
| Bilateral, above knee | 5 | 3 | 4 | 10 | 2 | 4 | 3 | 22 | 9 |
| One above and one below knee | 2 | 1 | 1 | 2 | 2 | 3 | | 6 | 5 |
| Bilateral, below knee | 3 | 1 | 1 | 2 | 1 | | | 7 | 1 |
| Total | 10 | 5 | 6 | 14 | 5 | 7 | 3 | 35 | 15 |

## Summary

During a six and one-half year period (May, 1950, through December, 1956), 50 patients with bilateral amputation of lower extremities were treated and followed up at the Bay State Medical Rehabilitation Clinic, Boston. On admission, one-half of them were over 60 years of age, with an average of 55 years for the entire group. There were 41 men and 9 women. There were 31 patients (62%) with bilateral amputations above the knee, 8 (16%) with bilateral amputations below the knee, and 11 (22%) with amputations both above and below the knee. Most of the arteriosclerotic patients were elderly and had bilateral amputations above the knee.

After appropriate training programs, 70% of the patients were considered rehabilitated, with 30% becoming economically independent. The effects of age, primary etiology, and site of amputation on the outcome of rehabilitation were analyzed. It seemed that these had no direct bearing on the patient's potentiality to become self-sufficient in activities of daily living. Lack of motivation and presence of severe medical complications were most likely the contributing factors in the failures.

Massachusetts General Hospital, Charles Street (14) (Dr. Watkins).

V 16
1958

# CLINICAL NOTES

## IMMUNIZATION AGAINST TETANUS AND DIPHTHERIA WITH SPECIAL COMBINED TOXOID

Beryl S. Graham, M.D., M.P.H., Henrik L. Blum, M.D., M.P.H.
and
Thomas W. Green, M.D., Ph.D., Berkeley, Calif.

Childhood immunization against diphtheria and tetanus has been established as a desirable and effective procedure. Ipsen[1] has recently clearly reemphasized the need for the continuance of this important immunization program into the older children and adult groups. Unfortunately, the frequency of severe local and systemic reactions to diphtheria toxoid injection in older children and adults has prevented widespread usage of this proved procedure. Many physicians have observed such reactions even after using the Schick test to determine the susceptibles in the group. Moreover, such screening procedures are inconvenient and cumbersome when one is dealing with large numbers of persons.

From the Contra Costa County Health Department and Cutter Laboratories. Dr. Graham is now with the Bureau of Maternal and Child Health, Los Angeles County Health Department.

Extensive studies by Edsall and his colleagues[2] have indicated that a satisfactory combined tetanus and diphtheria toxoid for adults could be produced and used, provided that the diphtheria toxoid was highly purified and used with an adjuvant. With such a toxoid a satisfactory primary immunization was obtained by giving two injections spaced four weeks apart, followed by a third dose 6 to 12 months later. The response to this combined toxoid when used for booster doses was found to be completely satisfactory. As a result of these studies the National Institutes of Health, U. S. Public Health Service, have established minimum requirements for the combined toxoid which is officially named tetanus and diphtheria toxoids combined precipitated, adsorbed (for adult use).

Although this product has been used routinely in the U. S. armed forces since 1955, it has only recently become available through normal channels to physicians. In this report we describe our clinical experience and the diphtheria antitoxin response in a group of 62 older adults (employee volunteers from the Contra Costa County Health Department), each of whom received two injections of this combined toxoid.

*Number of Local and Systemic Reactions* to Injections of Combined Toxoid in Sixty-two Older Adults*

| Injection | Local Reactions† | | | Systemic Reactions† | | |
|---|---|---|---|---|---|---|
| | None | Mild | Moderate | None | Mild | Moderate |
| First | 34 | 26 | 2 | 42 | 19 | 1 |
| Second | 36 | 23 | 3 | 42 | 18 | 2 |

* The four persons who had moderate reactions ranged in age from 31 to 41 years.
† There were no severe reactions, either local or systemic.

## Methods and Procedures

The preparation (Adult Dip-Tet) used was prepared in accordance with the specifications contained in the National Institutes of Health Minimum Requirements: tetanus and diphtheria toxoids combined precipitated, adsorbed (for adult use). Both toxoids were purified by alcohol fractionation methods, and the diphtheria component had a purity of greater than 1,500 Lf per milligram of nitrogen. The toxoids were completely adsorbed on aluminum hydroxide (Alhydrox diphtheria toxoid), and the final product contained 2 Lf of diphtheria toxoid per single dose. The preservative used was thimerosal 1:10,000.

The dosage schedule consisted of two 0.5-cc. injections given subcutaneously four weeks apart. Blood samples were obtained prior to each injection and four weeks after the last injection. After the final bleeding an intradermal test using 0.1 cc. of a 1:100 dilution of regular fluid diphtheria toxoid was done to determine the number of persons hypersensitive to this toxoid.

Local and systemic reactions were evaluated at 48 hours and were rechecked later by personal contact by one of us (B. S. G.). Local and systemic reactions were graded using the criteria described by Pappenheimer and others.[3]

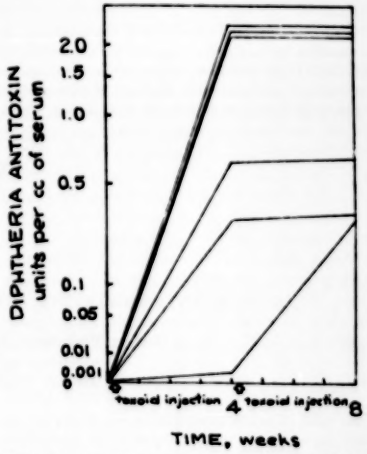
Local reactions were classed as mild if the local erythema was less than 4 cm. Moderate local reactions included those with erythema 4 to 8 cm. in diameter, and severe reactions included those greater than 8 cm. in diameter.

Systemic reactions were classed as mild when the temperature rise was less than 1 F and where only slight malaise, headache, or anorexia was noted. Moderate systemic reactions included those with temperature rise of 1 to 2 F and with complaints of malaise, headache, generalized aching, chilly sensations, anorexia, or nausea. Severe reactions were those with temperature rise greater than 2 F and with increased severity of the various symptoms listed above.

## Results

The table shows that no severe local or systemic reactions were encountered following either of the immunizing injections. Two of the 62 persons showed a moderate local reaction after the first injection, and one of these had a moderate systemic reaction. Following the second injection three persons had a moderate local reaction, and two of these had an accompanying moderate systemic reaction. The mild reactions were all trivial and in our experience reflect the usual incidence expected with close observation of the group.

Diphtheria antitoxin titrations were performed on all of the bloods obtained from 10 of the persons selected at random. In each instance when the preinjection titer was low, there was a tenfold to one-thousand-fold increase in antitoxin titer. The remaining 52 preinjection serums were screened to determine which persons initially had less than 0.0015 units per cubic centimeter and would therefore be considered susceptible.




Diphtheria antitoxin response in six persons with initial titers less than 0.0015 units per cubic centimeter.

Six such persons were found, and their postinjection diphtheria antitoxin titers are shown in the figure. These results show that five of the six persons with no demonstrable antitoxin responded promptly as if this were a booster injection. In one person an immune level was not reached until four weeks

after the second injection. None of these six nonimmune persons had any significant reaction to the immunization procedure.

### Comment

The satisfactory clinical experience in this group appears to be equal to or even more favorable than other studies of this nature. Pappenheimer and others [3] reported the frequency of local and systemic reactions following 5 Lf doses of diphtheria toxoid. In a group of 1,180 persons they encountered moderate or severe local reactions in approximately 8% of the persons and moderate or severe systemic reactions in 3%. Less than 10% of their group were over 35 years of age in contrast to our study in which 65% were over 35 years.

In another report Edsall and others [2] noted four moderate reactions and one severe local reaction in a group of 75 persons injected with 1 Lf of diphtheria toxoid adsorbed on aluminum phosphate. Two severe systemic reactions were also observed.

Our studies on diphtheria antitoxin response indicate that all 62 adults developed a good, solid immune status in response to two injections. These results are consistent with those reported by others. Edsall and others [2] have reported the antitoxin response to 2 doses of 1 Lf of diphtheria toxoid given three weeks apart and then a third dose given five months later. In their report the persons with titers less than 0.003 units per cubic centimeter were classed as susceptible and would be expected to show a positive reaction to the Schick test. Those with titers between 0.003 and 0.03 units per cubic centimeter would have borderline immunity, and those with titers over 0.03 were considered as solidly immune. They found that in a group of 252 young adults the number of subjects solidly immune after two basic doses of toxoid had increased from 32% to 83%. Three weeks after the third dose, over 99% had achieved a solid immunity status.

Our experience with this new combination of tetanus and diphtheria toxoids in 62 older adults has been completely confirmatory of previous reports. Our results show that the 2 Lf dose of highly purified diphtheria toxoid is acceptable from the clinical viewpoint, and we encountered no troublesome severe local or systemic reactions. The observed diphtheria antitoxin responses were excellent and are consistent with previous reports. These results show that the excellent childhood immunization program can be extended into adolescence and adulthood without fear of excessive reactivity and with confidence that good antitoxic immunity will be obtained.

#### References

1. Ipsen, J., Jr.: Immunization of Adults Against Diphtheria and Tetanus, New England J. Med. **251**:459-466 (Sept. 16) 1954.

2. Edsall, G.; Altman, J. S.; and Caspar, A. J.: Combined Tetanus-Diphtheria Immunization of Adults: Use of Small Doses of Diphtheria Toxoid, Am. J. Pub. Health **44**:1537-1545 (Dec.) 1954.

3. Pappenheimer, A. M., Jr.; Edsall, G.; Lawrence, H. S.; and Banton, H. J.: Study of Reactions Following Administration of Crude and Purified Diphtheria Toxoid in Adult Population, Am. J. Hyg. **52**:353-370 (Nov.) 1950.

## ACUTE INTERMITTENT PORPHYRIA WITH CONVULSIONS

Isidore Finkelman, M.D., Albert Sumner, M.D.
and
Horace Verde, M.D., Chicago

This case of acute intermittent porphyria is presented because of the occurrence of convulsive seizures as the only neurological manifestation, as well as several other unusual features. The porphyrins are pigments composed of four pyrrole rings connected by four methane bridges. These pigments are fundamentally related to cellular metabolism and are present in pure or bound form in both plant and animal life. Porphyrins are present in respiratory pigments such as hemoglobin, chlorophyll, cytochrome, and catalase. They occur in the pure state in the central nervous system in man. Porphyrins are excreted in the urine normally in amounts of 5 to 10 mcg. per day. There is an excessive excretion of the pigment in porphyria. An abnormal porphyrin metabolism is the basis of the clinical syndrome of porphyria.

There are three types of porphyria: the congenital, the acute intermittent (under consideration here), and the mixed or chronic form. Acute por-

From the Department of Neurology and Psychiatry, Northwestern Medical School, and Mount Sinai Hospital. Dr. Verde is a resident in neuropsychiatry at Mount Sinai Hospital.

phyria is sometimes precipitated by barbiturates, alcohol, sulfonamides, and arsenic. In most cases however, no immediate cause is found. All signs of chemical abnormality may be absent during the period of remission. Usually there are no cutaneous manifestations in acute porphyria. This is in contrast to the congenital or chronic form. Acute porphyria is more common in women and is characterized by episodes of intermittent acute abdominal, neurological, and mental symptoms followed by an asymptomatic period. This syndrome and the chronic form are sometimes grouped under the term "porphyria hepatica," because the liver in these cases is principally responsible for the abnormal formation of porphyrin.

## Report of a Case

A 39-year-old married woman with three children was admitted to the medical service June 7, 1957, with symptoms of constant epigastric pains of 10 days' duration, accompanied by 10 days of vomiting and 12 days of constipation. Her abdomen was distended and she had not moved her bowels for 12 days prior to admission. She had a history of digestive disturbance after meals for many years. She had had a cholecystectomy 18 months previously and also a surgical intervention for "adhesions." At the age of 17 she had an appendectomy and a partial oophorectomy. She had had a ruptured intervertebral disk 10 years previously.

The patient had been restless for several weeks prior to onset of symptoms and had been taking excessive amounts of glutethimide (Doriden), which she said that she "took like candy." Physical examination revealed a well-nourished, well-developed woman who was vomiting while being examined. There were no abnormal physical findings except for a distended abdomen and moderate epigastric area spasm. There were normal bowel tones. The neurological examination disclosed no abnormal findings except for hyperactive but equal deep reflexes. During this time she mentioned that she had had tingling of the lower extremities for the past four months.

While in the hospital, the patient continuously complained of epigastric pain and continued to vomit at frequent intervals. On the second day she had a grand mal seizure. This was followed by two similar seizures on the third day. These were generalized convulsions with tonic-clonic phases, with foaming at the mouth and biting of the tongue. On regaining consciousness she was transferred to the neuropsychiatric ward. When interviewed the patient appeared markedly tense and restless and was tossing in bed. She said she had been nervous since she was married. She depreciated herself and said she was an inadequate mother. Her husband and two sons, aged 11 and 17 years, "were so good," and she was in the hospital instead of taking care of them. She was worried about her 11-year-old son's clubfoot, which needed several corrective operations. The patient was very attached to her father, whom she described as very emotional, at times affectionate and other times cruel. She felt guilty about having envied her prettier sister and blamed herself for her sister's chorea. There was no history of convulsive seizures.

The urine was positive for porphyrin and was negative when the patient was in a state of remission. Complete blood and liver function tests were done, but only cephalin cholesterol flocculation was of note (2+). The electroencephalogram showed diffuse or diencephalic dysfunction with no evidence of an irritable focus. Therapy consisted of 25 mg. of chlorpromazine four times a day. The patient made a complete clinical recovery, and the urine findings for porphyrins were then negative. She was cheerful and functioned normally in ideation and emotion.

## Comment

This case is of interest because only convulsive seizures were present as neurological symptoms, in contrast to very grave neurological symptoms that are at times encountered. Patients may present symptoms simulating polyneuritis, poliomyelitis, and encephalitis. Our case is similar to that reported by Smeed.[1] His patient was admitted because of severe pain in the right upper quadrant of three months' duration, vomiting, and marked constipation. Phenobarbital was taken for about 10 days prior to admission. She had a grand mal seizure followed by four more during 24 hours. There were no neurological findings. Urine tests confirmed the diagnosis of acute porphyria.

The other interesting feature of this case is ingestion of glutethimide, a nonbarbiturate, in excessive amounts. Although alcohol, barbiturates, sulfonamides, and arsenic have been reported as agents precipitating symptoms,[2] glutethimide has not thus far been implicated.

Our patient recovered while under chlorpromazine treatment, but we believe that this treatment was coincidental rather than causative. Others have reported remissions after chlorpromazine therapy.[3]

Had mental symptoms occurred without the diagnosis of porphyria, electric shock therapy might have been considered. In fact others have given electric shock therapy in the presence of the diagnosis of porphyria.[4] This, in our opinion, is not a rational therapy in view of the organic cause, and moreover convulsive seizures may occur spontaneously, as in our case. Porphyrins should also be considered in the differential diagnosis of the convulsive states, as well as mental disorders classified as functional.

303 E. Chicago Ave. (11).

### References

1. Smeed, I. M.: Acute Porphyria with Epileptiform Convulsions, Postgrad. M. J. 32:401-403 (Aug.) 1956.

2. Martin, W. J., and Heck, F. J.: Porphyrins and Porphyria: Review of 81 Cases, Am. J. Med. 20:239-250 (Feb.) 1956.

3. Melby, J. C.; Street, J. P.; and Watson, C. J.: Chlorpromazine in Treatment of Porphyria, J. A. M. A. 162:174-178 (Sept. 15) 1956.

4. Lemere, F.: Treatment of Psychotic Complications of Porphyria by Electroshock, Am. J. Psychiat. 111:41-42 (July) 1954.

## DIAGNOSTIC PROBLEMS

# VOMITING AND JAUNDICE IN PREGNANCY

*Clinical Pathologic Conference (PM 412-57), May 2, 1957, from the Department of Pathology and the Hektoen Institute for Medical Research of Cook County Hospital, Chicago, presented for publication by Daniel S. Kushner, M.D., and Paul B. Szanto, M.D.*

### Clinical Data and Discussion

*Dr. Edmund F. Foley:* A 15-year-old girl was admitted to the Cook County Hospital on Feb. 27, 1957, in the 14th week of her first pregnancy, having had her last menstrual period Oct. 29, 1956. The patient had been well until two and a half weeks before admission, when she developed anorexia, increasing nausea, singultus, and persistent vomiting of blood-tinged watery material. She also complained of headache, dizziness, weakness, sore throat, pyrosis, shortness of breath, and "dyspepsia" with an oppressive feeling in the chest and abdomen. The menstrual history had been normal from the age of 13. She knew of no allergies.

Physical examination revealed an acutely ill, well-developed, moderately well-nourished girl in acute distress from singultus and hematemesis (benzidine test 4+). Her skin was warm and dry; tissue turgor was poor. Her temperature was 100 F (37.8 C), pulse rate 138, and blood pressure 114/56 mm. Hg. Her sclerae were subicteric. Her nasal mucosa appeared reddened. Her oral mucosa was dry; her pharynx was injected, and a thick mucoid postnasal discharge was noted. Carotid pulsations were prominent, as if she had empty arteries or dynamic heart action. Her heart was not enlarged, but a harsh grade 2 systolic murmur was heard at the apex and well transmitted to the base; the heart tones were of good quality; and sinus tachycardia was present. Her abdomen was flat and soft. A blunt, firm, tender liver edge was palpated 3 or 4 fingerbreadths below the costal margin. Right costovertebral angle tenderness was noted. Her uterus was enlarged to the size of a 14-week gestation; the fundus was poorly defined. Bowel sounds were active. Pelvic examination revealed a soft cervix with a large erosion, intact mucus plug, and normal adnexae.

Urinalysis revealed a specific gravity of 1.013, albumin 1+ to 0, sugar 0 to 1+, acetone 1 to 4+, urobilinogen 3 to 1+, and the sediment contained 5 to 30 leukocytes, 2 or 3 epithelial cells, and 2 to 4 yeast cells per high-power field. The hemoglobin level ranged from 70 to 59%, falling gradually as a result of the patient's illness, in spite of four blood transfusions. The erythrocyte count was 3,760,000 and 3,580,000 per cubic millimeter and the leukocyte count 13,100 to 21,000. No differential count was done. The blood Kahn test was negative. An electrocardiogram revealed sinus tachycardia, 107 beats per minute; PR interval 0.17 seconds, QT interval 0.36 seconds; intermediate electrical axis and nonspecific T-wave changes. Bacteriological culture of vaginal discharge revealed Escherichia coli. Blood and stool cultures were repeatedly negative. For biochemical data see the table.

The patient's fever was prominent and sustained, initially ranging between 100 and 103 F (37.8 and 39.4 C). Perhaps she had dehydration fever, but we see that most commonly in children. In adults, it is a good rule that fever is not the result of dehydration but that both stem from a common cause. Supportive therapy consisted of intravenous infusions of dextrose and water and 2 or 3 liters a day of saline solution, potassium chloride, belladonna, ascorbic acid, thiamine, promethazine hydrochloride, phenobarbital, chlorpromazine hydrochloride, and promazine hydrochloride. Whole blood transfusions eventually totaled 2,000 cc. Urinary output remained good. The patient's blood pressure ranged from 112 to 150 mm. Hg systolic over 60 to 40 diastolic. On the first day, 1,200,000 units of penicillin were given; 1 Gm. of tetracycline was given intravenously from the 2nd to 4th days; 2 Gm. of streptomycin was given intramuscularly, and 400 mg. of erythromycin was given daily from the 4th to the 8th days; 1,200,000 units a day of penicillin and 2 Gm. a day of streptomycin were given from the 9th to the 17th days; 5 to 10 Gm. of sulfadiazine was given intravenously and 2 Gm. a day of streptomycin was given from the 18th to the 21st days; 200 mg. a day of terramycin was given intramuscularly from the 22nd to the 27th days; 1 Gm. a day of tetracycline was given intravenously, and 2 Gm. daily of streptomycin was given from the 23rd to the 26th days. The patient had the whole gamut of antibiotic therapy. This suggests that she may have had a fever of undetermined origin, due to something other than infection.

Dr. Kushner is Associate Director of Medical Education of Cook County Hospital, and Instructor in Medicine, Northwestern University Medical School; Dr. Szanto is Director, Department of Pathology, Cook County Hospital, and Professor of Pathology, Chicago Medical School.

Dr. Foley is Head of the Department of Medicine, Cook County Hospital, and Professor of Medicine, University of Illinois College of Medicine.

On the third hospital day, abdominal distention, visual and auditory hallucinations, and equivocal nuchal rigidity were observed. This indicated some form of encephalopathy, perhaps a toxic psychosis. Because encephalitis was suspected, lumbar puncture was performed and was negative. The initial pressure was 210 mm. $H_2O$, with rise to 230 mm., and the closing pressure was 190 mm. The patient's temperature remained high. Vomiting, apathy, confusion, and psychotic behavior persisted with brief lucid intervals. Diarrhea became prominent on the 11th day, requiring treatment with opium. Sacral decubitus ulcers, which we usually associate with severe hypoproteinemia or a spinal cord lesion appeared. On the 18th day, temperature was again noted to be spiking to 103 F, and bilateral flank tenderness was observed. On the 23rd day, in view of increasing and rapid deterioration despite all antibiotic therapy, treatment with 40 units a day of corticotropin intravenously was instituted. The patient rallied briefly but high temperature persisted and she died after a total duration of illness of about seven weeks.

*Biochemical Data*

| Laboratory Values | 2/22 | 2/25 | 2/27 | 2/28 | Spinal | 3/13 | 3/15 | 3/18 | 3/19 | 3/20 |
|---|---|---|---|---|---|---|---|---|---|---|
| Nonprotein nitrogen, mg./100 ml. | 50 | ... | ... | 30 | ... | ... | 20 | 27 | 30 | 45 |
| Uric acid, mg./100 ml. | ... | ... | ... | ... | ... | ... | ... | 4.5 | ... | ... |
| Glucose, mg./100 ml. | 87 | ... | ... | ... | 72 | ... | ... | ... | ... | ... |
| Total protein, Gm./100 ml. | 5.5 | 4.4 | ... | 4.3 | 40 | 5.7 | 4.5 | ... | ... | ... |
| Albumin, Gm./100 ml. | ... | 2.4 | ... | 2.9 | ... | 2.7 | 2.7 | ... | ... | ... |
| Globulin, Gm./100 ml. | ... | 2.0 | ... | 1.4 | ... | 3.0 | 1.8 | ... | ... | ... |
| Gamma globulin, Gm./100 ml. | 1.40 | ... | ... | 0.79 | ... | ... | 1.05 | ... | ... | ... |
| Cholesterol, mg./100 ml. | 147 | 112 | ... | ... | ... | ... | ... | ... | ... | ... |
| Icterus index, units | 36 | 10 | ... | 13 | ... | ... | 7 | ... | ... | ... |
| Alkaline phosphatase, Bodansky units | 1.2 | ... | ... | 1.5 | ... | ... | ... | ... | ... | ... |
| Cephalin flocculation | 2+ | ... | ... | 2+ | ... | ... | 2+ | ... | ... | ... |
| Thymol turbidity, units | 3.0 | ... | ... | 1.0 | ... | ... | 3.5 | ... | ... | ... |
| Inorganic phosphorus, mg./100 ml. | 3.6 | ... | ... | 1.5 | ... | ... | ... | ... | ... | ... |
| Calcium, mg./100 ml. | ... | 10.3 | ... | ... | ... | ... | ... | ... | ... | ... |
| Sodium, mEq./liter | 123 | 130 | ... | 136 | ... | 138 | ... | ... | 130 | ... |
| Chloride, mEq./liter | 63 | 98 | ... | 99 | ... | 107 | ... | ... | 100 | ... |
| Potassium, mEq./liter | ... | 2.1 | ... | 2.9 | ... | 2.8 | ... | ... | 3.7 | ... |
| Carbon dioxide combining power, vol. % | 88 | 58 | ... | 54 | ... | ... | ... | ... | ... | ... |
| Amylase | | | | | | | | | | |
| Serum, Somogyi units | ... | ... | 16 | ... | ... | ... | ... | ... | ... | ... |
| Urine, Somogyi units | ... | ... | 16 | ... | ... | ... | ... | ... | ... | ... |

We have to decide whether this is toxemia of pregnancy or fever of undetermined origin, and I think the best approach would be through discussion of fevers of undetermined origin. When we are confronted with such a patient, we survey the situation, looking successively into a number of areas. The first is infectious diseases, and we consider viral, rickettsial, and bacterial agents. I think we would choose the bacterial and now must consider the species (cocci or bacilli) and possible pathogenesis. Did the patient have a septic abortion, or did she take some emetic agent to produce an abortion, in either case, terminating in a micrococcic septicemia? Instrumentation is unlikely because the mucus plug was still intact. The course is not typically that of a micrococcic septicemia, though I cannot deny it as a possibility. The other outstanding member of the bacterial group is the Mycobacterium tuberculosis, which, in a miliary dissemination, could cause everything that this patient had: the fever, central nervous system involvement, and the severe gastroenteritis.

The next area is that of the reticuloses, including histiocytic, reticulum cell, and lymphogranuloma groups of diseases. The third group of fevers is that of the connective tissue diseases, including lupus erythematosus, periarteritis nodosa, thrombocytopenic purpura, acute dermatomyositis, and systemic scleroderma. These are legitimate children of rheumatoid arthritis. In addition, there are the illegitimate children of Hamman-Rich syndrome, blood group reactions, and other collagen diseases. The fourth group is that of neoplastic disease, especially of such organs as the liver and kidney. These frequently occur with fever as a prominent or presenting manifestation. Then we proceed rapidly to a consideration of organ disease associated with fever, particularly disease of the liver.

If fever is sustained at high levels, one thinks of a form of reticulosis. If temperature spikes, as in this patient, below 98.6 F (37 C) and up to 105 F (40.5 C), we know it is a septic fever, caused by infection. As for the biochemical data, the total protein is low due to diminution of both albumin and globulin. This patient's albumin concentration was down practically to edema level. She had no significant gamma globulin reaction such as we see in liver disease or conditions associated with antibody formation, such as chronic tuberculosis. She entered with an icterus index of 36 but two days later it was 10 and was never greatly elevated thereafter, nor was the cephalin flocculation test elevated. The thymol turbidity was never stimulated. The phosphorus level was low and the calcium level normal. The hypochloremic alkalosis, hypo-

natremia, and hypokalemia were rapidly corrected by therapy and remained normal. The low serum potassium level was a reflection of the diarrhea.

I now am forced to conclude that this patient had a fever of undetermined origin due to something other than pregnancy. It was not a simple vomiting of pregnancy, and I might select miliary tuberculosis as the cause, but suppose we look at the roentgenograms.

*Dr. Leon Love:* The patient had two roentgenograms of the chest, both normal. There was no evidence of hilar adenopathy. The heart was within normal limits. The film was taken with the patient supine and there was relative elevation of the diaphragm. There was no bony lesion. The lungs were clear. The next film was taken a week later. There was further elevation of the diaphragm but this undoubtedly was taken with the patient lying down so that the apparent upward shift could be accounted for by displacement of the abdominal contents and the pregnancy. The increase in heart shadow is accounted for on that basis, and the lungs were clear. On the abdominal film, there was a well-defined fetus which would place the pregnancy at about the fifth or sixth month.

*Dr. Frederick Steigmann:* Do you see evidence of hepatomegaly in the abdominal film?

*Dr. Love:* Liver enlargement is hazardous to read at best into a conventional film. With all that midline mass and gaseous distention, I would make no statement regarding the size of the liver.

*Dr. Steigmann:* When we saw this patient on the ward she was semicomatose. We were impressed with the large, tender liver. We believed that she had a toxic hepatitis, perhaps related to a toxemia of pregnancy.

*Dr. Samuel J. Hoffman:* Would you comment on the wide pulse pressure?

*Dr. Foley:* The question posed is, could this be a manifestation of sepsis? The wide pulse pressure does not bother me so much when I realize she was five months pregnant, but a systolic pressure of 150 mm. Hg is hypertensive for a pregnant woman. It should be less than 100 at five months. This would be in keeping with a toxemia of pregnancy. We cannot deny the possibility of an aortic insufficiency on the basis of bacterial endocarditis.

*Dr. Paul B. Szanto:* Could this patient have had a hyperemesis gravidarum?

*Dr. Foley:* This patient's history and course are very reminiscent of the description of toxemia of pregnancy.[1] This could be toxemia alone, but I believe there must have been something else going on.

*Dr. S. Howard Armstrong Jr.:* It is true that an occasional hyperemesis gravidarum will produce an esophagitis, but those patients have pain and other manifestations.

*Dr. Szanto:* This patient had a schizophrenic episode too.

*Dr. Foley:* I think that is why we must put them all together. The reaction she had could have been part of a delirium, pure and simple. I think there is a definite entity of profound metabolic disturbance with sudden dehydration which can produce delirium, but here delirium came too soon in the course of a hyperemesis gravidarum. It seemed to me that she had some form of encephalopathy, a multiple system disease, or a sepsis of some sort.

*Dr. Harold M. Schoolman:* Could the diarrheal episode have been the result of the antibiotic therapy?

*Dr. Foley:* Yes. She was a vulnerable target for any organism, but the antibiotics did not particularly influence her febrile course.

*Question:* What about the decubitus ulcers? We usually see them terminally in cachectic patients but she was well nourished.

*Dr. Foley:* These ulcers formed a month later, after she had been febrile and had had diarrhea, but I respect your point, because any time we see patients with decubitus we believe they have a cord lesion or severe hypoproteinemia and so are a vulnerable target for Proteus vulgaris infection.

*Clinical Diagnosis.*—The clinical diagnosis was hyperemesis gravidarum with toxic hepatitis and fever, probably due to sepsis of undetermined origin.

### Pathologist's Report

*Dr. Szanto:* The body was that of a well-developed, well-nourished girl, who looked older than her stated age. No edema was present. The breasts were enlarged. The uterus reached to the level of the umbilicus and contained a male fetus 17 cm. in length. The pituitary was enlarged (1.1 Gm.) due to the numerous large pregnancy cells belonging to the acidophilic series of the anterior lobe. The adrenals were moderately enlarged, consistent with pregnancy, but the lipid content of the cortex was decreased. The brain was grossly normal. Histological study of sections taken from the various parts of the brain revealed only a nonspecific diffuse, moderate, proliferation of the oligodendroglial cells.

The three cardinal clinical manifestations which must be explained are (1) vomiting, (2) pyuria, and (3) diarrhea.

Was the vomiting due to toxemia? Eclampsia and preeclampsia should be clearly separated from hyperemesis gravidarum or pernicious vomiting, since only preeclampsia and eclampsia belong to toxemia proper. We must decide whether we are dealing with an unusual early variant of eclampsia. Morphologically, the characteristic changes of eclampsia are found in the kidney and liver. In this instance, the basement membranes of the glomerular tufts were delicate. They did not show the characteristic swelling of eclampsia. The liver was enlarged (2,900 Gm.), and its consistency was de-

creased. Microscopically, fibrin thrombi in the sinusoids and hemorrhagic necroses were not present in the peripheral zones of the lobules as are characteristic of eclampsia, but fatty changes were noted (fig. 1), more pronounced in the central zone and

Fig. 1.—Fatty changes in liver ("toxic hepatitis"), (hematoxylin-eosin stain, × 120).

decreasing in severity toward the periphery of the lobules. Some of the liver cells contained bile pigment, and a few bile casts were also seen. The nonvacuolized liver cells were swollen and granular. The morphologic appearance of the liver was compatible with the diagnosis of toxic hepatitis.

Having excluded eclampsia, was this a hyperemesis gravidarum? The patient had severe vomiting in the 12th week of pregnancy. This is rather late, but hyperemesis gravidarum may begin late.[2] The hepatic changes described are characteristic for, but not pathognomonic of, hyperemesis gravidarum and could be explained on the basis of septicemia or nutritional deficiency. Among the multiple precipitating factors that may lead to pernicious vomiting or to vomiting of late pregnancy, we must search for infection, focal or systemic. The spleen was enlarged (290 Gm.), soft, and grossly as well as microscopically had the typical appearance of a septic splenitis. The lungs together weighed 800 Gm. The lower lobes contained microscopic foci of bronchopneumonia. The heart was normal (300 Gm.). The urinary bladder was normal. The ureters were moderately dilated (the right more than the left), as is usually found in pregnancy, but not inflamed. The heart, lungs, uterus, and lower urinary tract offered no explanation for the septic splenitis.

The kidneys were markedly enlarged, their combined weight being 700 Gm., or twice the normal. After stripping the capsule, the surface of both kidneys revealed numerous yellow nodules, distributed at random, pinhead sized to larger, with a tendency to confluence. On section, the cortex was wide and bulging and showed numerous yellow streaks. Similar streaks were seen also in the medulla. The mucosa of the pelvis was injected. Histologically, the kidney showed cortical abscesses and streaks of inflammatory cells in the cortex and medulla. A few of the glomeruli were heavily infiltrated with leukocytes, showing beginning abscess formation, while others appeared entirely normal. The periglomerular connective tissue was infiltrated with lymphocytes and leukocytes. The tubules were dilated and contained numerous leukocytes. The lining epithelium showed extensive degenerative changes and disintegration (fig. 2), resulting in the formation of excretion abscesses with occasional

Fig. 2.—Disintegrating dilated tubules containing numerous leukocytes (hematoxylin-eosin stain, × 120).

central clusters of bacteria. The interstitial tissue around the tubules was heavily infiltrated by inflammatory cells, leukocytes predominating.

Pyelonephritis occurring during pregnancy is usually of the ascending type. In this case, however, the bilateral, uniform, diffuse involvement of the

kidney, the absence of a severe pyelitis, ureteritis, and cystitis, and the involvement of some of the glomeruli speak for a hematogenous type of pyelonephritis. The postmortem bacteriological examination revealed Esch. coli, but this does not exclude the possibility of a micrococcic etiology.

The patient had a sore throat in the early phase of her illness. The possibility that the pharynx was the port of entry of the renal infection should be considered. Experimentally, intravenous inoculation of rabbits with bacteria will lead to hematogenous pyelonephritis if the ureters are constricted. In this patient, as in any pregnant woman, there was a moderate dilatation of the ureters. This dilatation, which commences about the fourth month of gestation, is not due to compression of the ureters at the brim of the pelvis by the pregnant uterus, but is due to atonia of the smooth muscles of the ureters, resulting in stasis of urine which facilitates the development of a hematogenous [3] as well as ascending pyelonephritis. Finally, the possibility of a lymphogenous spread of Esch. coli from the adjacent colon should be considered.[4] However, this should involve only the right kidney. It has been noted that this relates to the extensive anastomoses between the lymphatics of the right kidney and ascending colon.

Fig. 3.—Pseudomembranous colitis.

The third clinical manifestation that had to be explained was the severe diarrhea. The stomach, duodenum, and jejunum were normal. The distal ileum showed enlargement of the Peyer's patches and superficial ulceration of the mucosa. Microscopically, the mucosa and submucosa were infiltrated by lymphocytes, plasma cells, and leukocytes. The entire colon showed numerous plaques (fig. 3) varying in size between 0.3 and 1.5 cm., covered by green-yellow, friable, pseudomembranes. These lesions were particularly numerous in the descending colon and rectum, down to the anal region. Microscopically, in some areas, the mucosa was preserved, the glandular structures showed marked distention due to increased mucin production, and the mucosa and submucosa were infiltrated by acute and chronic inflammatory cells. The pseudomembranes were composed of fibrin, cellular debris, and inflammatory cells. Occasional microabscesses were seen in the submucosa.

Having ruled out shigellosis, amebiasis, and salmonellosis on the basis of the morphologic appearance and negative bacteriological and parasitological findings, the diagnosis of pseudomembranous enterocolitis was made. The absence of any evidence of reparative changes, the predominant pseudomembranous character of the lesions, and the microabscesses speak against a chronic idiopathic ulcerative colitis. In recent years some cases of pseudomembranous colitis have been attributed to the use of antibiotics. Originally, it was interpreted as an allergic reaction to the antibiotics, but, lately, it has been related to emergence of antibiotic-resistant micrococci.[5] It should be pointed out that this lesion was observed before the introduction of antibiotics, especially in debilitated patients undergoing major operations.[6] Therefore, a critical evaluation of the cause and effect relationship of antibiotics to enterocolitis is necessary. In any case, one may say that any drastic change in the intestinal flora may precipitate severe enterocolitis. In this patient the distribution of the lesions that involved the entire rectum to the anal region supports the assumption that the intestinal lesions were related to the administration of antibiotics.

*Pathological Diagnosis.*—The pathological diagnosis was acute pyelonephritis with excretory abscesses, bilateral; pseudomembranous enterocolitis; toxic hepatitis; septic splenitis; bilateral bronchopneumonia (terminal); and pregnancy (sixth month of gestation).

### Comment

*Dr. Szanto:* This patient developed persistent vomiting in the 12th week of her pregnancy, leading to severe dehydration. Despite its late onset, we would like to relate the vomiting to hyperemesis gravidarum. Psychogenic or infectious factors may precipitate hyperemesis. At the onset of the disease, the patient had a sore throat, and bac-

teria may have reached the kidneys by hematogenous dissemination leading to pyelonephritis. This could have been a precipitating cause of severe hyperemesis, which led to marked dehydration, hypochloremic alkalosis, hyponatremia, and hypokalemia. The jaundice and hepatomegaly resulted from a toxic hepatitis developing in the course of hyperemesis and dehydration. Anemia and leukocytosis were reflections of infection whose localization in the kidneys was manifested by albuminuria, pyuria, and azotemia. Although the electrolyte imbalance was corrected, the pyelonephritis did not respond to vigorous antibiotic therapy. Indeed, it progressed, leading to septicemia (urosepsis). Diarrhea developed due to a pseudomembranous ileocolitis related to the antibiotics.

**References**

1. De Lee, J. B.: Obstetrics, ed. 11, edited by J. P. Greenhill, Philadelphia, W. B. Saunders Co., 1955.
2. Sheehan, H. L.: Pathology of Hyperemesis and Vomiting of Late Pregnancy, J. Obst. & Gynaec. Brit. Emp. 46:685-699 (Aug.) 1939.
3. Crabtree, S. G., and Prather, G. C.: Urinary Diseases in Pregnancy: Consideration of Preventive and Therapeutic Measures in Treatment and Conservation Surgery, J. Urol. 26:499-517 (Oct.) 1931.
4. Franke, cited by Eastman, N. J.: Williams Obstetrics, ed. 10, New York, Appleton-Century-Crofts, Inc., 1951, p. 756.
5. Heim, W., and Zuschneid, K.: Aetiology, Klinik und Prophylaxe der antibiotischen Schaden in der Chirurgie, Antibiotica et Chemotherapia 3:18, 1956.
6. Pettet, J. D.; Baggenstoss, A. H.; Judd, E. S., Jr.; and Dearing, W. H.: Generalized Postoperative Pseudomembranous Enterocolitis, Proc. Staff Meet. Mayo Clin. 29:342-349 (June 16) 1954.

## COUNCIL ON DRUGS

### Report to the Council

*The Council has authorized publication of the following report. Nonproprietary terminology is used for all drugs that are mentioned; when such terminology is not considered to be generally well known, its initial appearance is supplemented by parenthetic insertion of names known to be applied to commercial preparations.*

H. D. KAUTZ, M.D., *Secretary.*

# CURRENT STATUS OF THERAPY IN UPPER RESPIRATORY INFECTIONS

**Floyd W. Denny Jr., M.D.**
**and**
**John H. Dingle, M.D., Cleveland**

Infections of the upper respiratory tract are the most common illnesses suffered by man; their treatment, therefore, constitutes one of the largest problems faced by many physicians. A study in a group of Cleveland families has shown that respiratory infections accounted for two-thirds of all illnesses, the average incidence being over six respiratory infections per person per year. Less than 1% of these illnesses involved the lower respiratory tract, and less than 3% were caused by bacteria. In a similar study in university students, Evans reported that less than 10% of all respiratory illnesses were caused by recognized bacteria; about 70% were infections of the upper respiratory tract.

At the present time, no antimicrobial agents are available that are effective in the treatment of nonbacterial respiratory diseases; on the other hand, effective means of therapy are available for the bacterial infections of the tonsils and the pharynx. The group A hemolytic streptococci are the etiological agents in most of the bacterial infections that will respond to specific therapy. The knowledge that rheumatic fever and acute hemorrhagic glomerulonephritis can be prevented by adequate treatment of streptococcic infections has emphasized the need for prompt recognition and treatment of these illnesses. Specific therapy occasionally becomes necessary for complications of viral respiratory infections and rarely for infections due to bacteria other than the group A streptococci. Therefore, the main problem in the management of patients with upper respiratory tract infection is one of diagnosis, which, for the most part, means the identification of streptococcic sore throats.

A current classification of upper respiratory infections is presented as follows. It includes the bacterial, viral, and fungal infections that involve principally the upper respiratory tract, and also the bacterial and viral infections in which the involvement of the upper respiratory tract is a minor part of a more extensive infection. The diagnosis

From the departments of preventive medicine, pediatrics, and medicine, School of Medicine, Western Reserve University, and the University Hospitals.

*Classification of Upper Respiratory Infections*

Involvement of Upper Respiratory Tract (Outstanding):
- Bacterial
  - Streptococcic sore throat
  - Diphtheria
  - Vincent's infection
- Viral or presumably viral
  - Common cold
  - Herpangina
  - Adenovirus infection
  - Herpes simplex infection
- Fungal
  - Thrush

Involvement of Upper Respiratory Tract (Minor Part of More Extensive Infection):
- Bacterial
  - Meningococcic infection
  - Hemophilus influenzae infection
- Viral or presumably viral
  - Influenza
  - Infectious mononucleosis
  - Rubeola
  - Rubella
  - Roseola infantum
  - Poliomyelitis

and treatment of these infections, both supportive and specific, will be discussed. In addition, the complications that are encountered while using specific therapy and the methods for the prevention of respiratory infections will be outlined.

## General Aspects of Treatment

Symptomatic and supportive treatment of patients with upper respiratory infections, regardless of etiology, consists of rest, analgesia, and relief of local symptoms. Rest should be assured, and sedatives, such as the barbiturates, should be used if necessary. Acetylsalicylic acid (aspirin) is the drug of choice for relieving generalized malaise and localized aches and pains. Care should be exercised in the administration of this drug to children because of the possibility of overdosage and the production of salicylism. Sore throat usually responds to the administration of aspirin, but in severe cases codeine may be necessary. Some patients also obtain relief from the pain and "tightness" of throat infections by the use of warm gargles or irrigations with isotonic sodium chloride solution. A local vasoconstrictor in isotonic sodium chloride solution may be used as nose drops for the relief of nasal congestion, but such medication should be limited to the duration of the acute infection.

Cough, when troublesome, can be controlled by the use of humidifiers and codeine. It seems to make little difference whether the moisture added to the air is hot or cold. Codeine alone or cough syrups containing codeine are equally effective. Adequate fluid intake should be insured, particularly in infants with fever, but solid foods are not contraindicated if well tolerated. Such "cold cures" as special diets, purgatives, diuretics, diaphoretics, alkalis, counterirritants, vitamins, antihistamines, and medicated lozenges and sprays are not effective.

An attempt should be made in every upper respiratory infection to establish an etiological diagnosis. Since antibiotic or chemotherapeutic agents are not effective in viral infections of the upper respiratory tract, they should not be employed. If the infection is caused by a bacterial agent, therapy directed against the specific organism should be given. It should be emphasized that, when the appropriate drug has been selected, it should be administered in effective doses long enough to produce maximal benefits.

## Specific Diagnosis and Treatment of Major Upper Respiratory Infections

*Streptococcic Sore Throat.*—Infections with group A streptococci are characterized by the sudden onset of sore throat, headache, fever, chilliness, malaise, abdominal pain, nausea, and vomiting. Sore throat is the most outstanding symptom and is usually associated with acute pain on swallowing. The temperature of the patient varies, but it is generally over 101 F (38.3 C). Gastrointestinal symptoms of abdominal pain, nausea, and vomiting are more common in children than in adults. Simple coryza, hoarseness, and cough are not usually prominent. Physical examination shows diffuse redness and enlargement of the tonsils and of the lymphoid tissue of the pharynx. The uvula is occasionally edematous. Discrete to confluent yellowish white exudate may be found on the tonsils and on the pharyngeal wall but rarely on the uvula. The lymph nodes at the angle of the jaw are swollen and tender. With high fever there may be a flush to the skin, and the appearance of the rash of scarlet fever is diagnostic of a streptococcic infection.

Experience has shown that about one-half of the respiratory infections caused by the Streptococcus organisms are not typical enough to permit a firm clinical diagnosis. In this event, a leukocyte count and a throat culture are of great value. The leukocyte count is typically elevated, usually to above 12,000 per cubic millimeter, but counts above 20,000 are not rare. The presence of large numbers of hemolytic streptococci on a blood-agar plate is almost always diagnostic.

When the diagnosis of a streptococcic infection is made, antibacterial therapy should be instituted as rapidly as possible. However, the delay that is necessary to confirm the diagnosis bacteriologically does not reduce the efficacy of penicillin in the prevention of rheumatic fever. Penicillin is the drug of choice, and the intramuscular route is recommended because it insures adequate treatment. Regardless of how the drug is administered, it is essential that the patient be treated for a period of 10 days to insure eradication of the organisms.

V 1
195

The following regimens, listed in the order of preference, have been found to be satisfactory: 1. Benzathine penicillin G (Bicillin, Permapen): one intramuscular injection of 600,000 units (children) or 900,000 units (adults). 2. Procaine penicillin G with aluminum monostearate in oil (Depo-Penicillin, Lentopen): one intramuscular injection of 300,000 units (children) or 600,000 units (adults) every third day for three doses. 3. Procaine penicillin G as an aqueous suspension: one intramuscular injection of 300,000 units every day for 10 days. 4. Penicillin in the form of a buffered soluble salt of penicillin G, potassium penicillin O (Cer-O-Cillin Potassium), or phenoxymethyl penicillin (Pen-Vee, V-Cillin): 250,000 to 500,000 units (depending on the form) given orally four times a day for 10 days, administered 30 minutes before meals or 2 hours after meals.

Other antibiotics are not as effective as penicillin in eradicating streptococci or in preventing the nonsuppurative complications; therefore, their use should be reserved for patients who cannot tolerate penicillin. In such patients erythromycin (Erythromycin, Ilotycin), tetracycline (Achromycin, Panmycin, Polycycline, Tetracyn), chlortetracycline (Aureomycin) hydrochloride, or oxytetracycline (Terramycin) hydrochloride should be given in full therapeutic doses for 10 days, or approximately 22 to 44 mg. per kilogram (10 to 20 mg. per pound) of body weight per day for children and 1 to 2 Gm. per day for adults. Treatment with the sulfonamide drugs is not effective.

*Diphtheria.*—In contrast to most other infections of the upper respiratory tract, diphtheria is a serious and, at times, fatal disease. Fortunately, its occurrence is now rare, but its potential danger should keep every physician alert to its diagnosis. It is not within the scope of this paper to review completely the symptoms, signs, and treatment of diphtheria; instead, a few of the more salient points in the management of these patients will be discussed.

The principal finding in patients with diphtheria is a gray, adherent membrane, often with tenuous edge, that may extend even beyond the tonsils and occasionally over the uvula. The tonsils frequently are large, but the mucosa of the pharynx is not usually as red as that found in streptococcic infections. The lymph nodes in the neck are enlarged. The patient is febrile and may appear more prostrated and have a faster pulse than the physical signs in the throat would indicate, although usually the fever is not as high and the general and local symptoms not as severe as with a streptococcic infection.

The initial diagnosis of diphtheria must be made by clinical means; it is not safe to delay treatment until laboratory confirmation is obtained. When the diagnosis of diphtheria is suspected, antitoxin should be administered in full therapeutic doses as soon as it can be determined that the patient is not sensitive to the antitoxin. Since the toxin produced by the diphtheria organisms is responsible for the serious nature of this disease, the administration of antitoxin is the most important aspect of therapy. It is desirable, however, to eradicate the diphtheria bacillus as quickly as possible, to prevent spread of the organism to contacts of the patient and to prevent the carrier state. Penicillin, chlortetracycline, and erythromycin have all been advised for this purpose, but their efficacy has not been adequately evaluated.

*Vincent's Infection.*—Vincent's stomatitis or Vincent's angina is the diagnosis given to a condition characterized by gingivitis and necrotic ulcers of the buccal mucosa, the tonsils, and occasionally the pharynx. These lesions are accompanied by varying degrees of systemic involvement. Direct smears from the lesions show spirochetes and fusiform bacilli, but there is no agreement as to whether these organisms are the actual cause of the disease or only secondary invaders. It is possible that the herpes simplex virus is a cause of some cases of Vincent's stomatitis, but this organism cannot be isolated from all cases, and it now seems probable that there are multiple etiological agents. Because the etiology cannot be determined in most cases, it is difficult to recommend specific therapy; the fact that numerous therapeutic agents have been advocated emphasizes the probability that none is entirely successful. Penicillin has been reported to be effective but, if used, should be given parenterally and not as a mouth wash. Good oral hygiene is an important aspect of therapy.

*Common Cold.*—Respiratory infections classified as the common cold are the most frequent of all infections. In the study of Cleveland families, this diagnosis was made in 40% of all illnesses and in 60% of all respiratory illnesses. The common cold may be defined as a mild, usually afebrile, upper respiratory tract infection in which most of the clinical signs are caused by inflammation of the mucous membranes of the nose. Occasionally, spread to contiguous structures, the paranasal sinuses or the pharynx, may occur. Sneezing, coryza, lacrimation, and scratchy throat are common symptoms, and physical examination shows little more than a red, edematous nasal mucosa. Laboratory tests are within normal limits.

The common cold is transmissible from one human host to another; it is also transmissible to the chimpanzee but not to the common laboratory animals. In the last three decades, several investigators have reported the cultivation of a common cold virus in embryonated eggs or tissue culture. These reports have not been confirmed. Recently, Price has isolated a virus from patients with illnesses resembling the common cold and has reported that a vaccine prepared with this virus prevented illness among the children injected in an

institution during an outbreak of upper respiratory infections. Sufficient data are not yet available to permit adequate evaluation of this report. In human transmission studies, as well as in epidemiologic studies in families, immunity to repeated infections has not been demonstrated. Since the clinical signs are so variable from one person to another, or even in the same person at different times, it is possible that the clinical syndrome now called the common cold is caused by multiple agents. Numerous drugs have been advocated for the specific treatment of the common cold, but none has proved to be effective when adequately tested under controlled conditions.

*Herpangina.*—Herpangina is an uncommon respiratory infection that may be caused by several of the Coxsackie A viruses. The characteristic lesions of this entity are commonly located on the anterior pillars of the fauces, are usually few in number, are 1 to 5 mm. in diameter, and appear as white or gray vesicles and later as ulcers surrounded by a red areola. A temperature occasionally as high as 105 F (40.5 C), sore throat, headache, myalgia, and abdominal pain are common features. The leukocyte count is usually normal, and throat culture shows normal flora. The clinical picture of herpangina is characteristic and allows a presumptive diagnosis which can be confirmed in the laboratory by isolating the virus and by demonstrating the development of antibodies to the virus in convalescent serum from the patient. The disease is self-limited; no specific treatment is available.

*Adenovirus Infections.*—The adenoviruses comprise a new group of viruses that were first described in 1953. These viruses are readily grown in tissue cultures, and at the present time more than 23 separate and distinct types, both of human and simian origin, have been described. Since not all adenoviruses have been associated with respiratory infections in man, mention will be made only of the two clinical entities in which there appears to be definite association between several of these viruses and upper respiratory disease.

The type 3 adenovirus and, rarely, several of the other types have been associated with nonbacterial pharyngitis or pharyngoconjunctival fever. This disease entity accounts for only a small part, approximately 1 to 4%, of the nonbacterial respiratory infections in the civilian population. It is characterized by a temperature often as high as 103 to 104 F (39.4 to 40 C) lasting 1 to 10 days, sore throat, headache, lassitude, and, in some instances, conjunctivitis. The sore throat is usually not as severe as with streptococcic infections. On physical examination, the tonsils and the lymphoid tissue of the pharynx are enlarged; the mucosal surfaces are red, and grayish white exudate may be present. If exudate is found, it is usually in small, discrete patches in the tonsillar crypts. Conjunctivitis, when present, is follicular in character and may involve one or both eyes. Cervical lymphadenopathy is common, and the nodes may be tender. The leukocyte count is normal in most cases.

Definite diagnosis can be made only by isolating the virus in tissue culture and by demonstrating the formation of antibodies in the host by neutralization or complement-fixation titrations. These laboratory aids, however, are not usually available and clinically are of limited value, because the results frequently can be obtained only after the patient has recovered. Since specific therapy is not indicated in nonbacterial pharyngitis or pharyngoconjunctival fever, it is important only to differentiate this entity from streptococcic sore throat. This can frequently be done by clinical means and the leukocyte count, but the absence of hemolytic streptococci on throat culture is most helpful in excluding the diagnosis of streptococcic disease.

During World War II the Commission on Acute Respiratory Diseases delineated a clinical syndrome in military recruits called acute respiratory disease (or ARD). Since the discovery of the adenoviruses, it has been shown that this syndrome is commonly associated with the adenoviruses, types 4 and 7. Infection with one of these viruses is the commonest cause of upper respiratory disease among recruits in the military service but is rarely seen among civilian populations. The cause for this paradoxical situation is unknown. ARD is characterized by a gradual onset, feverishness, chilliness, headache, malaise, and anorexia. The throat is sore, but usually without pain on swallowing. Hoarseness and cough are common. The temperature averages 101 F (38.3 C). On physical examination, the pharynx is moderately red, and the tonsils and lymphoid tissue may be enlarged. The cervical lymph nodes may be palpable but are not usually large and tender. The leukocyte count is normal. As with nonbacterial pharyngitis or pharyngoconjunctival fever, the specific diagnosis can be made by virus isolation or by demonstration of an increase in antibody titer in the serum after the infection. No specific treatment is available.

Antibodies to types 1, 2, 5, and 6 adenoviruses are commonly found in civilians of all ages, and these viruses have occasionally been isolated from patients with respiratory illnesses. As yet, however, there has been no frequent or consistent association between these types of adenoviruses, or the other remaining types, and clinical respiratory disease.

*Herpes Simplex Infection.*—The usual disease entity associated with the herpes simplex virus is herpes labialis (cold sore, fever blister), but occasionally, on first contact with this virus, children develop acute herpetic gingivostomatitis. This disease entity is characterized by marked systemic

V 1
195

reactions and oral lesions consisting of vesicles which rapidly rupture, leaving a gray membrane or ulcer. The tongue and cheek show these lesions most frequently, but other parts of the mouth and pharynx may be involved. The lesions are quite characteristic and are not usually confused with other infections of the throat. There is no effective therapeutic agent against the herpes simplex virus.

*Thrush.*—Thrush is a common infection caused by the fungus Candida (Monilia) albicans and is found principally in infants and debilitated children or adults. The disease is manifested by the appearance on the mucous membranes of the mouth and throat of confluent, pearly white, elevated patches which, when forcibly removed, leave a raw surface. Few symptoms are referable to these lesions. The diagnosis can be confirmed by demonstrating the characteristic budding, yeast-like fungus with hyphal fragments in fresh smears from the lesions, or by cultivating the fungus on common laboratory mediums. Prior to the introduction of antibiotics, corticotropin (Acthar, Corticotropin, Depo-Acth), and cortisone (Cortisone, Cortogen, Cortone) acetate, the disseminated form of the disease was rare. In recent years, however, pneumonia, involvement of the gastrointestinal tract, and generalized moniliasis have become more common, particularly as a complication in patients who are receiving antibiotic drugs or adrenal cortical steroids.

Thrush usually responds to the local application of a 1% solution of gentian violet, a 1% solution of borax in glycerin, or a 20% aqueous solution of sodium caprylate. Attention to the over-all health of the patient is important. Recently a new antibiotic, nystatin (Mycostatin), has been found to be effective in monilial infections and can be employed locally or orally. The drug should be tried in cases resistant to the usual therapy or in cases in which the infection has spread to the gastrointestinal tract. Nystatin is poorly absorbed from the gastrointestinal tract and is probably not effective in other types of moniliasis.

### Upper Respiratory Tract Infections Associated with More Extensive Disease

*Meningococcic Infection.*—Patients with meningococcic infections, either meningitis or meningococcemia, frequently have mild symptoms referable to the upper respiratory tract, and cultures from the throat may show the presence of meningococci. Likewise, throat cultures from contacts of these patients may show meningococci. Although the possible relationship between the meningococcus and upper respiratory disease is recognized, this organism is not considered a common cause of primary upper respiratory infections. Therefore, the only time when the presence of the meningococcus in the throat assumes importance is when it is associated with more extensive and severe disease, and treatment should be limited to these cases.

*Hemophilus Influenzae Infections.*—The status of the association of H. influenzae and upper respiratory tract infections is similar to that described for the meningococcus. Patients with meningitis and laryngotracheobronchitis caused by this bacterium frequently have mild upper respiratory tract symptoms, and the organism may be cultured from the throat. Primary tonsillitis or pharyngitis due to the influenza bacillus, however, has not been recognized as a clinical entity and need not be considered in the differential diagnosis of uncomplicated upper respiratory tract infections.

*Influenza.*—Infections with influenza viruses, types A or B, occur either as sporadic cases or, more characteristically, in epidemics. Sporadic infections are infrequently recognized because the clinical picture is usually not distinct enough to allow separation from noninfluenzal illnesses constantly present in any population. In contrast, and as illustrated by the outbreak of type A Asian strain infection, typical cases are more readily diagnosed during epidemics when 10 to 20% of a population may be expected to manifest the disease within a period of several weeks.

The onset is usually abrupt, with chilliness, feverishness, headache, weakness, pain in the eyeballs, pain in the back, muscular aches, and frequently cough. The symptoms of coryza, sneezing, and hoarseness may be present but seldom are prominent. Temperature ranges from 101 to 105 F (38.3 to 40.5 C). Examination shows an acutely ill, prostrated patient with flushed face and, commonly, suffusion of the conjunctivas. The pharynx is red, and rales may be heard in the chest. The leukocyte count and the throat culture are usually within normal limits. As with most viral infections, the exact diagnosis depends on isolation of the virus or demonstration of the development of specific antibodies in the blood of the host.

Much has been written about bacterial complications in influenza. There can be little doubt that secondary bacterial infections, in particular bacterial pneumonia, contribute importantly to the death rates during epidemics of influenza. Such rates, however, have not been dramatically high in this country since the pandemic of 1918. The presently available antibiotic and chemotherapeutic drugs are not effective in the treatment of influenza, and bacterial complications so far have been infrequent. Accordingly, antimicrobial agents should be reserved until complications occur, or should be used routinely only in debilitated patients in whom complications would be especially dangerous. Patients suspected of having influenza should not be admitted to the hospital unless ab-

solutely necessary because of the danger of cross-infections with antibiotic-resistant strains of bacteria.

*Infectious Mononucleosis.*—Infectious mononucleosis is a generalized disease characterized by adenopathy, splenomegaly, hepatic involvement, pharyngeal lesions, an increase in the peripheral blood of mononuclear cells, many of which may be atypical lymphocytes, and an increase in heterophil antibodies. The pharyngeal lesions vary from petechial areas on the soft palate to a dirty gray membrane on the tonsils. Infectious mononucleosis is important in the discussion of respiratory infections because it is occasionally confused with streptococcic infections or diphtheria. Antibiotics are not effective in shortening the course of infectious mononucleosis.

*Others.*—Symptoms referable to the upper respiratory tract have been described in rubeola, rubella, roseola infantum, poliomyelitis, and in many other diseases, both infectious and noninfectious in etiology. In these diseases symptoms of involvement of the upper respiratory tract are of secondary importance to the generalized illness and require no specific antibiotic therapy.

### Bacterial Complications of Upper Respiratory Infections

The bacterial complications that occasionally accompany or follow upper respiratory infections are otitis media, mastoiditis, sinusitis, peritonsillar cellulitis, pneumonia, and meningitis. The bacteria usually involved are hemolytic streptococci (group A), staphylococci, pneumococci, and influenza bacilli. The total incidence of these complications is so low that the prophylactic use of antimicrobial drugs is not indicated except in cases in which such complications would be especially dangerous, such as in patients with severe heart disease, nephrosis, or chronic lung infections. Normal individuals with upper respiratory infections, therefore, should be observed carefully, and specific therapy should be started only when the clinical signs indicate that a complication has arisen. Before treatment is instituted, bacterial cultures should be obtained to determine the causative organism and, if necessary, to test its sensitivity to antibacterial agents. If an ineffective drug has been chosen initially, a more appropriate one can then be administered.

The selection of an antibiotic drug for the treatment of a complication usually must be made empirically. Certain factors, however, occasionally help in making the choice and will be mentioned briefly. Complications accompanying streptococcic infections usually are caused by this same organism and respond to the administration of penicillin, the drug of choice in uncomplicated streptococcic infections. Otitis media, the commonest complication of respiratory infections, is usually caused by pneumococci, H. influenzae, or hemolytic streptococci. If an exact etiological diagnosis cannot be made, otitis media should be treated with one of the broad-spectrum antibiotic drugs.

Chemotherapy is effective in most bacterial complications, but occasionally surgical intervention is necessary. Otitis media, peritonsillar cellulitis, and mastoiditis are examples in which the response after surgical treatment is frequently dramatic.

### Complications of Specific Therapy

The benefits derived from the use of chemotherapeutic and antibiotic agents far outweigh any of the reactions or complications that have arisen with the administration of these drugs. The complications that have been described with most of the agents in current use, however, are frequent and serious enough to cause some concern. Each time an antimicrobial agent is used, the physician should give careful consideration to the benefits that can be expected, as compared with the possibilities of encountering difficulty. It is the purpose of this section to call attention to the more common and serious types of complications that have been reported.

*Sensitivity Reactions.*—Sensitivity reactions may occur after the use of any of the antimicrobial drugs, but more than 90% of the reported cases have occurred with penicillin. The frequency of sensitivity reactions to penicillin appears to be increasing, probably because of the increase in use of the drug and possibly because it is more antigenic than has been thought. The vast majority of penicillin reactions occur after the intramuscular injection of the drug. Angioneurotic edema and urticaria are the most frequent types of reactions and are not usually severe, unless they are associated with cerebral or respiratory involvement. Anaphylactoid reactions are not as common but are always serious. Approximately 10% of the reported cases have been fatal, and more than 100 fatalities have been recorded. Illnesses resembling serum sickness occur infrequently and are not usually severe. Other dermal reactions, including exfoliative dermatitis, hemorrhagic purpura, and erythema multiforme, occur infrequently but are usually more severe in nature. Death has occurred in 10% of the reported cases.

*Gastrointestinal Disturbances.*—Nausea, vomiting, and diarrhea are encountered commonly after oral administration of the broad-spectrum antibiotics but, unless associated with staphylococcic superinfection as mentioned later, are not serious in most instances.

*Superinfections.*—After the use of most antimicrobial agents, one or more types of bacteria and fungi will frequently appear in abnormal numbers. Candida (Monilia), staphylococci, and gram-negative bacilli are the organisms most commonly found. Enterocolitis, associated with oral use of the

V 1
195

broad-spectrum antibiotics and due to Staphylococcus pyogenes var. aureus, is the most serious of the superinfections, particularly when it occurs as a complication of abdominal surgery. The case fatality rate is approximately 30%.

*Resistant Bacteria.*—Many bacteria, notably hemolytic streptococci and pneumococci, have maintained their sensitivity to most of the antibiotics. In contrast, gram-negative bacilli and staphylococci may be resistant to antimicrobial drugs or may rapidly develop such resistance. The management of infections due to these organisms is accordingly difficult, since antibiotic therapy may be ineffective. A number of studies have demonstrated that strains of staphylococci isolated in hospitals are more resistant to antibiotics than those isolated from the population at large. In general, the resistance of the hospital strains is connected with the amount and kinds of antibiotics used in a given institution. Hospital personnel become carriers of the resistant strains, and the environment becomes contaminated with these organisms. A high proportion of hospital-acquired infections are due to such strains. For these reasons, some authorities have recommended that the use of one or another of the broad-spectrum antibiotics, to which the hospital organisms are susceptible, be reserved solely for the treatment of hospital-acquired infections.

*Neurotoxicity.*—Vestibular and auditory disturbances have been described after the prolonged use of streptomycin and dihydrostreptomycin. The combined use of half-doses of each appears to be associated more frequently with hearing impairment than does the use of full doses of streptomycin alone.

*Hematological Problems.*—Aplastic anemia, leukopenia, and thrombocytopenic purpura have been reported after the use of chemotherapeutic and antibiotic agents, chiefly the sulfonamide drugs and chloramphenicol (Chloromycetin). These reactions are rare but can be quite serious, and some fatalities have been reported.

## Prevention and Control

Prevention of several of the bacterial and viral diseases discussed in this paper is possible, either by the prophylactic administration of an antimicrobial drug or by the injection of a vaccine to produce protective antibodies. Of the bacterial infections discussed, streptococcic and meningococcic infections and diphtheria can be prevented. Diphtheria toxoid, alone or in combination with tetanus toxoid or pertussis vaccine, has been widely and effectively used in the control of diphtheria.

At the present time there are no vaccines effective in the control of streptococcic infections, but these infections can be prevented by the prophylactic administration of several drugs. Prophylaxis is not recommended for routine use in normal individuals living at home; treatment after the development of symptoms is the preferred routine in this situation. Prophylaxis is especially indicated in individuals who have had rheumatic fever and who are subject to recurrences of this disease after subsequent streptococcic infections. Chemoprophylaxis may also be desirable to prevent the epidemic occurrence of streptococcic infections among closed population groups, such as military installations, boarding schools, or ship's personnel. Benzathine penicillin G, 1.2 million units given intramuscularly once a month, or a buffered soluble salt of penicillin G, 200,000 to 250,000 units given orally once or twice a day (not at mealtime), or sulfadiazine, 500 mg. to 1 Gm. given daily, is effective in preventing streptococcic infections.

The prophylactic use of drugs in the prevention of meningococcic infections is not usually necessary; in some situations, however, as when meningococcic disease is occurring epidemically in closed population groups, small daily doses of sulfadiazine (500 mg. to 1 Gm.) given for several days to all individuals are indicated. This same regimen may also be desirable for the family contacts of a patient with a meningococcic infection.

No chemoprophylactic agents are effective in preventing viral respiratory diseases, but vaccines are now available for use against influenza and adenovirus infections. Influenza vaccine is prepared from the developing chick embryo and usually contains both types A and B viruses. This vaccine has been very effective during certain epidemics; at other times, however, because of the changing antigenic patterns of the influenza viruses, the available vaccine has not been effective. During widespread epidemics, when the type of virus causing infection can be predicted with considerable accuracy, a vaccine prepared with this same strain of virus can be expected to be effective, a situation exemplified by the recent initial development and use of a type A Asian strain vaccine.

In the face of an epidemic or of a limited supply of vaccine, priorities for vaccination may be required. Before a community-wide program is instituted, preference generally should be given to persons engaged in maintaining the health of the community and basic community services, and to pregnant women and patients with chronic diseases for whom influenza may constitute a special risk. The vaccine should not be administered to persons known to be highly sensitive to eggs or chickens. The usually recommended doses of vaccine are as follows: for adults, 1 cc. administered subcutaneously; for children, 5 to 12 years of age, 0.5 cc. subcutaneously, repeated in 2 to 3 weeks; and for children, 3 months to 5 years of age, 0.1 cc. intradermally or subcutaneously, repeated in 2 to 3 weeks.

A vaccine containing two or three types of adenoviruses (types 3, 4, and 7) has been developed recently by means of tissue culture techniques similar to those employed in preparing poliomyelitis vaccine. When tested among military populations, this vaccine was effective in preventing the adenovirus disease so common in recruits (ARD). Because of the rarity of adenovirus infections among civilian populations, however, there is no indication at the present time for the general use of this vaccine.

Other methods for the prevention and control of upper respiratory infections should be mentioned only to stress their ineffectiveness. Control of airborne spread by ultraviolet rays or dust suppression, special diets or vitamins, tonsillectomy and adenoidectomy, bacterial or "cold" vaccines, and antihistaminic drugs have all been championed at some time, but they have been found to be of no value when adequately tested under controlled conditions.

## COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

*Because of its interest and concern in the field of postgraduate medical education, the Council on Medical Education and Hospitals is pleased to direct the attention of the medical profession and medical educators to the following special article. This analysis of postgraduate medical education in Kansas presented by the Department of Postgraduate Medical Education of the University of Kansas School of Medicine clearly portrays what physicians in that area actually do about their continuing education. It is to be hoped that other institutions active in this field will be encouraged to undertake such studies, as they would yield information of inestimable value to the planning of effective postgraduate opportunities.*

E. L. Turner, M.D., *Secretary*
*Council on Medical Education and Hospitals*

# POSTGRADUATE MEDICAL EDUCATION IN KANSAS

**Jesse D. Rising, M.D., Mahlon Delp, M.D., Edith P. Weinbach, B.J.**
**and**
**Robert C. White, A.B., Kansas City, Kan.**

Watchwords, although apt to be dangerous and misleading, have frequently spearheaded the most worthy human causes. "Taxation without representation," "Give me liberty or give me death!" and making the world "safe for Democracy" are but a few of the most obvious slogans that have contributed to our destiny. In medicine, as in other sciences, there is small room for the watchword with its associated emotionalism, but there has recently crept into the field of medical education a neat, terse watchword which typifies a change in the thinking of the entire profession—a change which will influence the health and well-being of a large portion of the population. The slogan is "Forty years, not four!" and refers to the ill-defined process of medical education which has become a life-long process; it is dramatic evidence of the solid ground on which postgraduate medical education stands.

Secure in the belief that the M.D. degree is only one formal step in the education of the physician, the University of Kansas School of Medicine has assumed active responsibility in the field of postgraduate education for the past 40 years. Spurred into greater action by the establishment of a department of postgraduate medicine headed by an academic chairman and a full-time director, the school has been able to develop an increasingly ambitious program which has been successful in establishing an excellent record of physician enrollments in postgraduate courses.

Such a program, with its deep roots and long growth, must at some time inevitably concern itself with an attempt to determine not only what it has done in the past but what it must yet do in the future. In this spirit of self-analysis and self-evaluation, sufficient information was gathered during 1955 and 1956 regarding Kansas physicians and their approach to postgraduate activities to justify some significant observations.

It was learned, for example, that, as a student body, Kansas physicians constitute a remarkable group. Records studied in 1956 revealed that 83% of the practicing physicians of the state had at some time attended at least one postgraduate course offered by the University of Kansas School of Medi-

From the Department of Postgraduate Medical Education, University of Kansas School of Medicine.

cine. Over 85% of this group had been in attendance within the immediate preceding five-year period. It was thus seen that 71% of all Kansas physicians in active practice had, during the preceding five-year period, attended one or more postgraduate courses at the University of Kansas Medical Center. From the records for 1955 and 1956 it was seen that Kansas physician enrollments in postgraduate courses offered by the University of Kansas School of Medicine amounted to approximately 64% of the active physician population of the state.

The path into analysis of postgraduate study by physicians is not without landmarks. In addition to various local studies, a survey prepared in 1955 by Dr. Douglas D. Vollan under the ægis of the American Medical Association's Council on Medical Education and Hospitals presents an excellent national report of investigation.[1] This report is of considerable value in providing a national scale by which individual efforts may be measured.

### Survey Method

In the spring of 1955 an extensive survey among the physicians of Kansas was undertaken by the department of postgraduate medicine of the University of Kansas with the cooperation of the Kansas Medical Society. Questionnaires were mailed to 1,450 Kansas physicians (M.D.'s) who were known to be in active practice at that time. Physicians in full-time practice at the University of Kansas Medical Center, retired or semiretired physicians, interns, and residents were excluded from the survey. The returns from this questionnaire totaled 902, or approximately 62% of the number to whom it was mailed.

The questionnaire, while preserving the anonymity of the physician, requested such information as age, year of graduation from medical school, number of years of internship and residency, size of community in which he practiced, type of practice, and certification by specialty boards or membership in the American Academy of General Practice. Each respondent was also asked to estimate in hours the amount of formal postgraduate work he had taken in the past three years. By "formal" postgraduate work the questionnaire intended to signify attendance at a postgraduate course offered by a medical school and not to imply attendance at scientific programs of various medical organizations. The three-year base period was used to obtain a more accurate over-all picture, and it was patterned on the standard of time set by the American Academy of General Practice in determining the postgraduate obligations of its members.

The initial tabulation of questionnaires revealed that approximately 62% of the sample group were in general practice (table 1). This percentage corresponds almost exactly to the estimated percentage of general practitioners in the United States. This figure also corresponds to the actual total percentage of generalists now practicing in the state of Kansas. These correlating percentages, then, would seem to indicate a fair sampling from the standpoint of specialists versus generalists.

Our questionnaire revealed that slightly over one-half (54.6%) of the respondents were in solo practice, as compared to the remaining respondents who were either in partnership (23.9%) or group practice (20.1%) or, as with a small percentage, in institutional (0.6%), governmental (0.6%), or similar practice (0.2%).

In an effort to clarify and evaluate the significance of the amount of postgraduate work taken by the respondents as expressed in hours, an arbitrary division was made to distinguish between adequate, inadequate, and superior amounts of work. Following the standard set by the American Academy of General Practice, it was decided that 50 hours of formal postgraduate work every three years was a necessary minimum. Therefore, responses that showed less than 50 hours of work were classified as inadequate for our study. This

TABLE 1.—*Physicians in Specialty and General Practice*

| Classification | Respondents | |
|---|---|---|
| | No. | % |
| Certified specialists | 337 | 36.38 |
| Uncertified specialists | 108 | 11.97 |
| Total | 345 | 38.25 |
| Part-time specialists | 168 | 18.62 |
| General practitioners | 389 | 43.13 |
| Total | 557 | 61.75 |
| Total respondents | 902 | 100. |

assumption was made with some reservation, inasmuch as no one has demonstrated that 50 hours of postgraduate work taken every three years is a reasonable minimum. Furthermore, mere clock hours of attendance as a sole criterion of learning is not a reliable index; attitude, interest, teaching techniques, selection of topics, and many other elements are factors which must certainly be considered. Any respondent who reported more than 150 hours of postgraduate work within the preceding three-year period was classified as having taken a superior amount of work.

There are many factors, both personal and professional, which determine how much postgraduate work each physician takes and where he takes it. A thorough consideration of the significant professional factors has been presented in Vollan's study,[1] and it is not our purpose merely to sound a regional echo of what has been established for the nation by that work. But there remain, nevertheless, some significant deviations and observations in Kansas that are noteworthy.

### Problems of Solo Practice

It is readily understood that one of the major problems of postgraduate attendance is that of disposition of patients while the physician is necessarily absent from his practice. Vollan states, "The greatest single deterrent to postgraduate attendance is the lack of someone to care for the physician's patient while he is away." [2] Physicians in partnership are not so deeply concerned with this problem, and those physicians practicing within a group usually benefit from annual "leave time" scheduled for the express purpose of attendance at postgraduate courses. The physician in solo practice who, because of the isolated nature of his professional efforts, would seem to benefit the most, is usually the one who can least afford to leave his patients to participate in postgraduate activities.

According to information supplied by the respondents, the problem of solo practice in Kansas does not influence the actual educational activities as physicians nationally were of the opinion it would. In table 2 one notes that patient disposition has almost no significance in its relationship to the amount of postgraduate work taken by the physician. One of the reasons for this may be the fact that Kansas has for some time followed one of the three basic precepts of the Kansas Plan for Rural Health: sponsorship, promotion, and execution of a planned and regularly scheduled circuit program throughout the state. Under the leadership of Dr. Franklin D. Murphy, then Dean of the University of Kansas School of Medicine, point 3 of the Kansas Plan, as formulated in 1948, promised to provide adequate postgraduate medical education to all Kansas physicians: "Cities in Kansas will be chosen for their strategic geographic location, and teams of instructors made up of members of the faculty of the medical school and qualified practitioners of medicine in Kansas will travel from one city to the next giving the newest and most practical information in diagnosis and treatment of specific medical problems."

TABLE 2.—*Disposition of Patients and Amount of Postgraduate Work*

| Patient Disposition | No. of Replies | Postgraduate Work in Past 3 Yr., % | | |
|---|---|---|---|---|
| | | <50 Hr. | 50-150 Hr. | >150 Hr. |
| Partner cares for patients | 360 | 25.8 | 44.5 | 28.7 |
| No partner to care for patients | 368 | 26.5 | 49.4 | 24.2 |

For six months during the year, under the present Kansas extramural postgraduate plan, two separate teams of instructors go out each month to travel a combined distance of approximately 1,800 miles to bring annually 30 hours of category 1 postgraduate education to each enrollee in eight different circuit centers throughout the state. With the total yearly enrollment at the circuit courses averaging over 400, the problem of "getting away" is, apparently, minimized for a large portion of the physician population in Kansas.

### Specialized versus General Practice

Organizers and planners in postgraduate education realize that their programs ought to be tailored to fit the needs of the entire physician population with which they are concerned. It becomes temptingly easy for medical schools with their predominance of highly trained specialists to indulge heavily in postgraduate activities which may have a limited appeal. Considering that almost 62% of the national physician population is in general practice, it is apparent that postgraduate education planning must consider their needs in proper proportion. In the recent past, this has not occurred in the country as a whole. Vollan reported, regarding the 1952-1954 study, "An overwhelming majority of postgraduate courses are offered in special fields or specialty subjects. Only a small fraction of the opportunities (4.1%) are primarily and specifically in the field of general medicine, i. e., for general practitioners." [3] It might well be that some courses in special fields would be of more interest to physicians in general practice than would some courses in general medicine. Approaching the study from a different angle by inquiring for whom the courses are designed, the most recent study of postgraduate courses (for the year Sept. 1, 1956, to Aug. 31, 1957), reported by the Council on Medical Education and Hospitals of the American Medical Association, shows that 68.3% of all the courses taking place that year in the United States were specifically and primarily designed for physicians in general practice and another 11.3% were designed for both general practitioners and for physicians in

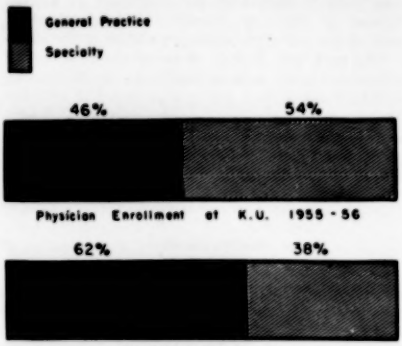



Fig. 1.—Type of practice of physicians in Kansas and postgraduate study.

full-time specialty practice. Only 20% of the 1956-1957 courses were designed primarily for full-time specialists.[4]

The University of Kansas does not propose to aim any course "down" to the general practitioner. Instead, programs are designed with a diversity of appeal for all physicians in all fields of practice, though not necessarily attempting to appeal to all in each program. Enrollment figures for the year 1955-1956 at the University of Kansas present an interesting picture. Forty-six per cent of the total number of physician enrollments from all states was accounted for by doctors in general practice (fig. 1).

It has been reported that for the United States as a whole full-time specialists take larger amounts of postgraduate work than do their colleagues in general practice—8.1 days per year for full-time specialists, as contrasted to 5.6 days per year for general practitioners and 7.8 days for part-time specialists.[5] This condition is significantly altered in Kansas (table 3). Among the physicians responding to the questionnaire, the percentage of general practitioners reporting "inadequate" amounts of postgraduate work was less than the equivalent percentages of the specialists.

TABLE 3.—*Relationship Between Type of Practice and Amount of Postgraduate Work Taken in Past Three Years*

| Practice | No. of Replies | Postgraduate Work in Past 3 Yr., % <50 Hr. | 50-150 Hr. | >150 Hr. |
|---|---|---|---|---|
| Certified full-time specialty | 167 | 31.7 | 43.1 | 25.2 |
| Uncertified full-time specialty | 81 | 27.2 | 45.6 | 27.2 |
| Part-time specialty | 125 | 16.0 | 50.4 | 33.6 |
| General (total) | 289 | 29.1 | 46.7 | 24.2 |

## Geographical Factors

Considerable point has been made of the necessity for making postgraduate work available to physicians in remote areas of the nation, and it is undoubtedly true that men practicing in extremely isolated districts encounter more difficulty in obtaining adequate postgraduate experience than those to whom postgraduate activities are more easily accessible. It was surprising, therefore, to find that the distances involved in the state of Kansas did not have an adverse effect upon the number of hours of formal postgraduate work taken. As shown in figure 2, physicians who are under the necessity of traveling over 250 miles for all but circuit courses had a smaller percentage of representatives reporting an "inadequate" amount of postgraduate work than any other group. Furthermore, they had a larger percentage of representatives who reported an excess of 150 hours. One might conclude from this information that there is almost an inverse relationship between the necessary travel distance and the amount of postgraduate work taken.

## Size of Community

An interesting and possibly related factor that influences the amount of postgraduate work which the physician seeks is the size of the community in which he practices. It was found that, generally

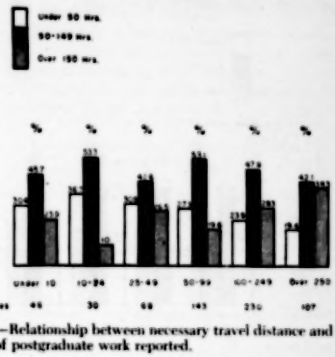



Fig. 2.—Relationship between necessary travel distance and amount of postgraduate work reported.

speaking, a smaller percentage of physicians from communities of 20,000 or less reported "inadequate" postgraduate work than did physicians from larger communities (fig. 3). One factor may be that of medical isolation; physicians from larger communities may receive more of their postgraduate education by personal contacts with colleagues and consultants, whereas physicians from smaller com-

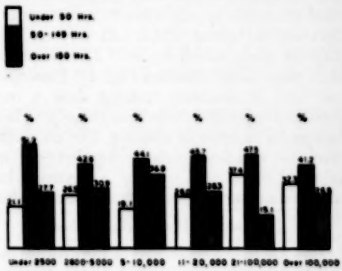



Fig. 3.—Relationship between community size and amount of postgraduate work taken in the past three years.

munities depend more on postgraduate courses for their education and for their professional contact with other doctors.

Physicians from the smaller and more isolated communities are forced to assume responsibility for the widest possible range of medical care and must rely on their own resources to a greater extent than

physicians in larger communities. It seems reasonable to assume, therefore, that they may be motivated to increase their postgraduate work because of the challenges arising in their practices, whereas physicians in urban communities with easily available consultations for difficult problems are less strongly motivated in this regard.

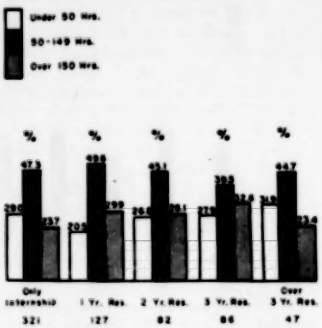



Fig. 4.—Relationship between duration of residency training and amount of postgraduate work reported.

### Residency Training and Postgraduate Work

With respect to physicians throughout the country, it has been shown that there is a direct correlation between the length of residency and amount of postgraduate work taken,* but it was found that this correlation is not valid for Kansas. No significant difference in postgraduate activity was shown between the group which had only an internship and the group which reported a residency of more than three years' duration (fig. 4). Physicians with one year of residency training show a record of more postgraduate study than those who have had two years or more of training. The data otherwise show no significant relationship between number of years of hospital training a physician has had and the amount of postgraduate work he takes.

### Financing Postgraduate Courses

Fees are only a small part of the expense incurred by physicians in attendance at postgraduate courses. Respondents were asked to estimate the cost per day (exclusive of fees) in taking postgraduate work, but they were not queried as to whether loss of income occasioned from absence from practice should be considered. This fact must be kept in mind while examining the following data. Approximately 5% of the responding physicians estimated their expenditure at postgraduate courses to exceed $100 per day. This figure indicates that loss of income was included in the estimate. However, a realistic picture of postgraduate expense may be drawn from the fact that over 65% of the respondents estimated their daily expenditure at less than $50, with 45% reporting costs of less than $25 per day. It seems probable that such estimates do not include loss of income in addition to subsistence and travel expense, and we may assume that these figures represent actual out-of-pocket expenditure involved in daily postgraduate participation. In any case, it is obvious that the fees paid are by no means the major part of the outlay which physicians make in order to avail themselves of postgraduate courses.

Conservative estimates show that fees cover only about one-half of the total expense incurred in putting on a first-class postgraduate program; the remainder is paid out of current operating expenses of medical schools and by various volunteer health agencies and grants.

In regard to the question of responsibility for the cost of postgraduate education, the physicians were overwhelmingly of the opinion that income from fees should support courses or that they should accept full financial responsibility for their own postgraduate training (86.6% so reported). Yet, in considering the data concerning opinion on current fees, a contradiction becomes apparent. Less than 5% of the respondents indicated that present fees were too low; about 70% replied that current fee schedules were all right, and nearly 7% were of the opinion that they were too high. Significantly, under 20% of those responding had no opinion on the subject. There is no great difference of opinion about postgraduate fees among physicians in rural areas as compared to their cosmopolitan colleagues (table 4).

It becomes apparent that either the facts regarding this matter are not known or they have been misrepresented. There can be no question that the majority of physicians feel that they wish to accept full financial responsibility for their postgraduate work, but when one considers the fact that over two-thirds of the doctors are of the opinion that current fees are about right, one can only conclude that, in general, they are not aware of the expense involved in presenting first-rate postgraduate courses.

TABLE 4.—*Opinions on Present Postgraduate Fees Relative to Community Size*

| Community Population | No. of Replies | Opinion, % | | | |
|---|---|---|---|---|---|
| | | Too High | Too Low | About Right | No Opinion |
| <2,500 | 153 | 7.85 | 7.85 | 68.0 | 16.3 |
| 2,500-5,000 | 91 | 7.70 | 1.1 | 70.3 | 20.9 |
| 6,000-10,000 | 84 | 2.40 | 4.8 | 76.2 | 16.6 |
| 11,000-50,000 | 163 | 6.10 | 3.1 | 77.3 | 13.5 |
| 21,000-100,000 | 125 | 8.80 | 4.0 | 63.2 | 24.0 |
| >100,000 | 182 | 6.70 | 4.9 | 69.2 | 19.2 |
| Unclassified | 52 | 9.60 | 7.7 | 53.8 | 28.9 |
| Total | 850 | 6.95 | 4.7 | 69.55 | 18.8 |

While it might be reasonable to assume that physicians would willingly accept some financial support from volunteer health agencies, it is unlikely that the majority of medical men, knowing all the facts, would wish the medical schools to continue to subsidize postgraduate work at the expense of other projects. Whatever the answer, there is a

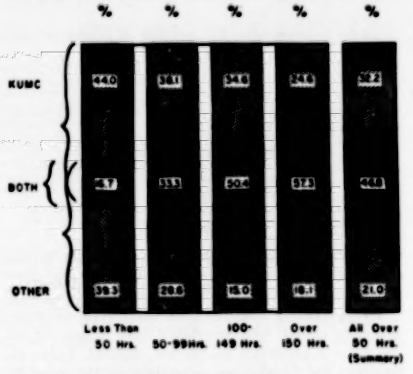



Fig. 5.—Amount of postgraduate work reported in the past three years and place taken (KUMC refers to University of Kansas Medical Center).

clear-cut necessity for clarification of financial responsibility in the field of postgraduate medical education.

## A Look to the Future

Any medical school engaged in postgraduate education must eventually concern itself with the question of educational responsibility toward the physicians within the region which it serves. Certainly the University of Kansas has come to be regarded as fulfilling its obligations and responsibilities in this respect. Whether this is true or not,

TABLE 5.—*Age of Physician in Relation to Community Size*

| No. of Replies | Age Group | <2,500 | 2,500-5,000 | 6,000-10,000 | 11,000-20,000 | 21,000-100,000 | >100,000 |
|---|---|---|---|---|---|---|---|
| 163 | <35, % | 27.6 | 13.5 | 11.6 | 12.9 | 12.9 | 21.5 |
| 300 | 35-44, % | 16.8 | 10.4 | 10.7 | 19.1 | 18.1 | 24.9 |
| 211 | 45-54, % | 18.0 | 9.0 | 8.5 | 26.1 | 14.7 | 23.7 |
| 161 | >55, % | 19.25 | 12.0 | 11.2 | 19.9 | 17.4 | 19.25 |
| 844 | Total, % | 20.41 | 11.48 | 10.50 | 19.62 | 15.75 | 22.34 |

objective information reveals the possibility for betterment. Figure 5 demonstrates that one-fifth of those physicians reporting adequate postgraduate hours indicated that none of their work had been done at the University of Kansas.

It is evident that, despite the generally high enrollment records for Kansas, there is a significant portion of the physicians in the state that are not being reached. It will be our challenge in the future to determine the reason for this situation and to direct our efforts to improving it.

Many questions arise in connection with the formulation of policy and long-range planning in an organization concerned with postgraduate education for physicians. Some of these questions seem to bear no relationship whatever to education, and, because the educators have no ready answers, opinion often serves for fact. It is desirable, for example, to know where physicians in the various age groups practice. Table 5 shows that, at present,

TABLE 6.—*Age Distribution of Physicians Within Population Groups*

| Population | No. of Replies | <35, % | 35-55, % | >55, % |
|---|---|---|---|---|
| <2,500 | 166 | 27.1 | 54.2 | 18.7 |
| 2,500-5,000 | 94 | 23.4 | 54.2 | 22.4 |
| 6,000-10,000 | 88 | 21.6 | 57.9 | 20.5 |
| 11,000-20,000 | 167 | 12.6 | 68.2 | 19.2 |
| 21,000-100,000 | 130 | 15.4 | 64.0 | 20.6 |
| >100,000 | 193 | 18.1 | 65.8 | 16.1 |

there is a tendency for younger physicians to concentrate in the smallest communities, and we find over 27% of them in these localities, as compared to only approximately 20% of all physicians. Again, in table 6, we see the age distribution of physicians within each population group; it is evident that the smaller communities are served to a considerable extent by younger men. There is no doubt that some of these men have temporarily established themselves in practice in the smaller communities in an effort to recoup their finances. It is not unreasonable to conclude, however, that a fair percentage of them have become interested in rural practice as a result of the Kansas Rural Health Program and the University of Kansas Preceptorship Program, both of which stress practice in rural areas.

Still another aspect of this general problem is illustrated in table 7, which reveals a trend toward

TABLE 7.—*Year of Graduation as Related to Size of Community*

| | | % in Community Size | | | | | |
|---|---|---|---|---|---|---|---|
| Graduation, Yr. | No. of Replies | <2,500 | 2,500-5,000 | 6,000-10,000 | 11,000-20,000 | 21,000-100,000 | >100,000 |
| Since 1950 | 93 | 43.3 | 16.7 | 11.1 | 12.2 | 5.6 | 11.1 |
| 1945-1949 | 101 | 21.8 | 9.9 | 10.9 | 12.9 | 15.8 | 28.7 |
| 1940-1944 | 172 | 11.1 | 10.5 | 12.2 | 20.9 | 15.1 | 30.2 |
| 1934-1939 | 156 | 16.7 | 8.9 | 10.3 | 21.8 | 20.5 | 21.8 |
| 1930-1934 | 114 | 11.4 | 11.4 | 7.9 | 25.5 | 21.9 | 21.9 |
| 1924-1929 | 85 | 18.8 | 7.1 | 12.9 | 27.1 | 9.4 | 24.7 |
| 1920-1924 | 45 | 22.2 | 13.3 | 4.4 | 15.6 | 17.8 | 26.7 |
| Before 1920 | 73 | 23.3 | 15.1 | 11.0 | 17.8 | 20.6 | 12.3 |

practice in larger communities prior to 1945 and a definite if not dramatic reversal of this trend since then.

There is an unquestioned tendency for men who have had considerable hospital (residency) training to establish practice in larger communities, and

it is no surprise to learn, as shown in table 8, that the smaller communities have almost no representatives from this group. General practitioners are in the majority only in towns of less than 10,000 population, and they constitute the vast majority of

TABLE 8.—*Years of Residency Training of Physicians Practicing in Communities of Various Sizes*

| Community Population | No. of Replies | % Having Various Amounts of Training | | | |
|---|---|---|---|---|---|
| | | None | 1 Yr. | 2 Yr. | 3 Yr. |
| <2,500 | 166 | 95.8 | 2.4 | 1.8 | 0 |
| 2,500-5,000 | 94 | 73.5 | 16.0 | 2.1 | 6.4 |
| 5,000-10,000 | 88 | 54.5 | 21.6 | 9.1 | 14.8 |
| 11,000-20,000 | 167 | 44.3 | 22.2 | 12.0 | 21.5 |
| 21,000-100,000 | 136 | 32.35 | 18.4 | 16.9 | 32.35 |
| >100,000 | 160 | 36.4 | 17.1 | 22.3 | 24.2 |

physicians in towns of less than 5,000. In spite of this, a few full-time specialists, including certified specialists, have established themselves even in the smallest communities. It is worthy of note that partial specialists are fairly numerous in towns with 5,000 to 20,000 population.

The past 30 years have witnessed rapid advances in medical science with a corresponding increase in the amount of graduate training that physicians have taken and an increased tendency toward specialization. From 1920 until 1944 there was a definite and continued rise in the number of men who had three years of graduate training (table 9) and in the number of men assuming full specialty practice (table 10).

With the American Academy of General Practice assuming an increased interest in graduate training for general practitioners, one may confidently predict that, while the trend away from general practice may have been halted, there will continue to be a trend toward more graduate training for all physicians. The data concerning medical graduates

TABLE 9.—*Relationship Between Year of Graduation and Amount of Residency*

| Graduation, Yr. | No. of Replies | % Having Residency Training | | | |
|---|---|---|---|---|---|
| | | None | 1 Yr. | 2 Yr. | 3 Yr. |
| Since 1950 | 93 | 81.9 | 11.8 | 2.2 | 1.1 |
| 1945-1949 | 167 | 43.0 | 15.9 | 13.1 | 28.0 |
| 1940-1944 | 178 | 25.3 | 19.7 | 15.2 | 39.8 |
| 1935-1939 | 106 | 36.1 | 25.9 | 13.3 | 24.7 |
| 1930-1934 | 115 | 37.4 | 25.2 | 17.4 | 20.0 |
| 1925-1929 | 87 | 43.7 | 17.2 | 16.1 | 23.0 |
| 1920-1924 | 52 | 65.4 | 15.4 | 9.6 | 9.6 |
| Before 1920 | 91 | 80.6 | 9.7 | 3.2 | 6.5 |

of the year 1950 (tables 9 and 10) are decidedly misleading, since so few of these graduates had yet had the opportunity to establish themselves as a result of their military obligations and graduate training.

The general impression of a state such as Kansas is that a large number of physicians are forced to practice a fairly primitive type of medicine. If this assumption were accepted it would have considerable influence on the type of postgraduate work offered for these doctors. The facts controvert this implication, however, for over 95% of 902 respondents are members of at least one hospital staff (3.1% are not, and 1.1% gave no answer), and over 90% of them have an approved hospital available in their immediate community (5.5% do not, and 2.2% gave no answer). This is not a surprising fact

TABLE 10.—*Relationship Between Year of Graduation and Type of Practice*

| Graduation, Yr. | No. of Replies | % in Each Type of Practice | | | |
|---|---|---|---|---|---|
| | | Uncertified Specialty | Certified Specialty | Partial Specialty | General |
| Since 1950 | 103 | 3.9 | 0 | 7.8 | 88.3 |
| 1945-1949 | 167 | 17.8 | 18.7 | 7.5 | 56.0 |
| 1940-1944 | 178 | 10.1 | 41.0 | 17.4 | 31.5 |
| 1935-1939 | 106 | 13.3 | 28.3 | 20.5 | 37.9 |
| 1930-1934 | 115 | 14.8 | 32.2 | 22.6 | 30.4 |
| 1925-1929 | 87 | 17.3 | 28.7 | 20.7 | 33.3 |
| 1920-1924 | 52 | 13.5 | 19.2 | 30.8 | 36.5 |
| Before 1920 | 91 | 22.0 | 13.2 | 30.8 | 34.0 |

when one considers that only 10 counties in the state lack a class A hospital.[7] The available hospitals vary considerably in size (table 11).

The potential audience for each type of postgraduate course will inevitably have a bearing on the type of programs which are planned. Table 12 presents the breakdown according to the type of practice reported by our respondents. It will be noted in this table that partial specialists are grouped with the other specialists on the assumption that their postgraduate requirements will be similar. In other classifications they have been grouped with the general practitioners, since they must, as a group, be functioning largely as family physicians in spite of their special interests. It is interesting to note the distribution of physicians in some of the major fields. Eighty-nine doctors reported that they were specializing to some extent in internal medicine, and 42 of these men were certified internists. The proportion of certified specialists in obstetrics and gynecology is somewhat smaller, while the partial specialists seem to

TABLE 11.—*Hospital Beds Available in Immediate Community*

| Beds, No. | Replies | |
|---|---|---|
| | No. | % |
| 1-15 | 27 | 3.0 |
| 16-30 | 111 | 12.3 |
| 31-50 | 66 | 7.3 |
| 50-100 | 148 | 16.4 |
| 101-200 | 155 | 17.2 |
| 200+ | 270 | 29.9 |

have greater importance in this field. This may possibly indicate that many of the physicians in general practice have developed a particular interest and facility in obstetrics, and have therefore made it an increasing part of their practice, while their colleagues have taken care of some of the other types of practice for them. Ophthalmology,

orthopedic surgery, and psychiatry are predominantly fields for specialists and, to a large extent, for certified specialists. The same is true of otolaryngology, but to a somewhat lesser extent. On the other hand, only about 25% of the men reporting surgery as their major field of interest are certified, whereas over 60% report themselves as partial specialists. This may mean that two-thirds of the physicians in the state with whom surgery is a major part of their practice are actually family physicians with a special interest (and perhaps special training) in surgery.

TABLE 12.—*Number of Physicians in Each Specialty*

| Specialty | Certified | Uncertified | Partial Specialist | Total |
|---|---|---|---|---|
| Allergy | 0 | 2 | 1 | 3 |
| Anesthesia | 9 | 1 | 10 | 20 |
| Cardiovascular disease | 2 | 1 | 3 | 6 |
| Contagious disease | 0 | 0 | 0 | 0 |
| Dermatology | 7 | 0 | 1 | 8 |
| Gastroenterology | 1 | 1 | 1 | 3 |
| Internal medicine | 42 | 26 | 21 | 89 |
| Malignant disease | 0 | 1 | 0 | 1 |
| Neurosurgery | 4 | 0 | 0 | 4 |
| Neurology | 1 | 2 | 0 | 3 |
| Obstetrics-Gynecology | 12 | 10 | 17 | 39 |
| Occupational medicine | 0 | 0 | 1 | 1 |
| Ophthalmology | 20 | 8 | 6 | 34 |
| Orthopedics | 16 | 1 | 1 | 18 |
| Otolaryngology | 18 | 14 | 2 | 34 |
| Pathology | 5 | 2 | 0 | 7 |
| Pediatrics | 15 | 6 | 6 | 27 |
| Physical medicine | 1 | 0 | 0 | 1 |
| Plastic surgery | 2 | 0 | 0 | 2 |
| Preventive medicine | 4 | 6 | 0 | 10 |
| Proctology | 0 | 1 | 0 | 1 |
| Psychiatry | 13 | 4 | 0 | 17 |
| Pulmonary disease | 1 | 1 | 1 | 3 |
| Radiology | 20 | 1 | 3 | 24 |
| Surgery | 37 | 15 | 92 | 144 |
| Thoracic surgery | 2 | 0 | 0 | 2 |
| Urology | 5 | 5 | 2 | 12 |
| Total specialists | 237 | 108 | 168 | 513 |
| General practice | | | | 389 |
| Grand total | | | | 902 |

These figures are of interest when compared with the national average,[8] which shows 98% of the radiologists, 92% of the ophthalmologists, 73% of the orthopedists, 72% of the pediatricians, 65% of the otolaryngologists, 64% of the neurologists and psychiatrists, 63% of the urologists, 58% of the obstetricians and gynecologists, 51% of the internists, and 48% of the surgeons to be board certified.

## Conclusions

The data presented here are not necessarily applicable to other regions. There is, nevertheless, a definite need for the administrators of any program of postgraduate medical education to have as much information as possible about the requirements of their potential students in order to determine what types of courses will have the most appeal and attract more physicians to continue their medical education throughout their lifetime of practice.

### References


1. Vollan, D. D.: Postgraduate Medical Education in United States, Chicago, American Medical Association, 1955.
2. Vollan,[1] p. 141.
3. Vollan,[1] p. 66.
4. Medical Education in the United States and Canada, report of the Council on Medical Education and Hospitals, J. A. M. A. 165:1393-1457 (Nov. 16) 1957.
5. Vollan,[1] p. 34.
6. Vollan,[1] p. 35.
7. Thiehoff, E. V.: Medical Services: Distribution of Physicians and General Hospital Beds in Kansas in 1955, J. Kansas M. Soc. 58:219-225 (April) 1957.
8. How Many Specialists Today Are Certified? M. Econ. 33:104-105 (June) 1956.


---

**TREATMENT OF HERPES ZOSTER.**—It is accepted generally that herpes zoster is a self-limited condition. The cutaneous manifestations clear spontaneously, even though scarring may remain. Also, the subjective symptoms subside without treatment in most cases. This allows for easy acceptance of new methods of therapy by enthusiasts and explains the plethora of recommended approaches. The therapeutic nihilist tends to adopt the opposite attitude and directs his treatment toward relief of symptoms by analgesics and antipruritics and lets Mother Nature take her course. Perhaps the wisest program lies somewhere between these two. . . . We found it difficult to establish a standard to measure therapeutic results in herpes zoster. Most patients do not remain under observation until the last vestige of cutaneous alteration or pain has disappeared. The ability to tolerate or ignore pain varies so much with individuals that this alone cannot be used as a criterion. It was decided that the greatest objectivity would be achieved by employing the time that the patient was so concerned that he remained under treatment as the end-point. . . . Altogether 231 patients with herpes zoster were treated by a variety of methods. . . . By our criteria it would appear that the type of treatment employed failed to shorten the course of the disease. Treatment and follow-up of herpes zoster cases is, nevertheless, desirable.—Ervin Epstein, M.D., and H. V. Allington, M.D., The Treatment of Herpes Zoster, *A. M. A. Archives of Dermatology*, October, 1957.

THE JOURNAL
OF THE AMERICAN MEDICAL ASSOCIATION
*Edited Under the Direction of the Board of Trustees*

*Editor and Managing Publisher* . AUSTIN SMITH, M.D.
*Associate Editor* . . . . . JOHNSON F. HAMMOND, M.D.
*Assistant Editors* . . . . . WAYNE G. BRANDSTADT, M.D.
FREDERIC T. JUNG, M.D.
EDWARD R. PINCKNEY, M.D.
*Assistant to the Editor* . . . . . MILTON GOLIN
*Editor for Medical Literature Abstracts* . GEORGE HALPERIN, M.D.
*News Editor* . . . . . CHARLES CHAPMAN

Subscription price . Fifteen dollars per annum in advance
Cable Address . . . . . "Medic, Chicago"

## THE OLD-FASHIONED TRANQUILIZER

### GUEST EDITORIAL

**Franklin G. Ebaugh, M.D.**

Every age and stage of the history of man has its trends and its fads and its outstanding, classic achievements. These are part of what makes up the spirit of an era and are later remembered with nostalgia—or something less—as "old times." The people of the time have characteristic ways of responding to this spirit, which dictates their outer environment and much of their inner milieu as well. It is foolishness to say that people are always the same; of course they are not. However, people always have the same basic problems to solve in order to function in their environment with some degree of satisfaction and productivity. They must find a way of fitting their inner needs to the requirements of their society—of releasing tensions without losing too much satisfaction and, conversely, of satisfying their needs without storing up too much tension.

Characteristic and popular ways of doing this vary somewhat with the times. With the horse and buggy belong walks in the moonlight, square-dancing socials, wandering preachers, and sassafras tea in the spring. The Stanley Steamer brought a change in tempo—prohibition honkytonks, Dixieland jazz, and "kick-pills" stronger than sassafras tea. The last 10 years have outlined clearly where the faster and faster pace of man and his imagination have been leading—into outer space and to the heritage of atomic power to be used or abused according to the speed, again, with which man can plan, work, and grow up. By this time it is news to no one that sassafras tea does not quite do the job any more and that, if we take even a superficial look at the world we are supposed to adjust to, our built-in "kick-pills" "rev" us up as fast as the human engine can rotate.

Our modern tempo problem is one of calming down to a cruising speed rather than building up to one, and too many of us have forgotten how to shift into "low." As usual, pharmacy and chemistry have tried to meet the challenge; we have not really progressed so far from the old traveling medicine man who brewed his potions to meet physiological and psychological emergency. We have, however, lost much of the effectiveness of this fairly honorable gentlemen, because our potions do not demand that we supplement them with reassuring faith about our ability to get well and cope with life, and with reintegration of emotional strengths that will actually enable us to do so.

The now famous tranquilizer is one of modern medicine's attempts to answer the physiological tempo problem of modern man. Its uses are many and invaluable in aiding people to adjust to stresses, challenges, and major and minor traumas. Like most medicines, activities, attitudes, and emotions—like everything in life—it demands moderation to retain its positive values. Its values are those of first aid and of supplementary pain relief; like a 10-minute nap after a night without sleep, the tranquilizer is what we take until we have time to remedy the real cause of our uncomfortable condition.

How, then, do we back up the tranquilizer? How do we use the time it gives us by producing a superficially calming effect and enabling us to continue to function in spite of unbearable inner or outer tensions? We develop a real tranquility when it comes from emotional balance within—the old-fashioned kind that people had to have in order to get by because they did not have a pill. A tranquilizing pill gives the illusion of calm—physical calm without emotional calm. It is like any analgesic pain reliever that reduces the sensation of pain but does nothing about either the pain or the cause of the pain. Sometimes, however, it gives us a respite from the immediate battle, perspective on our problems, time to think, time to realign our defenses against stress, and time to find new ways of gaining satisfaction and contentment.

V 1
195

While adults have some measure of control over the kind of environment in which they live, none of us can live in a vacuum. We can change residence, jobs, and personal associations; we can suppress worries, avoid experiences that frighten us, retreat from a dull reality into fantasy once in a while, take a vacation, or buy a television set. Part of the time we can avoid tensions. However, each of us must still work at something, not only because no society can survive unless each member contributes, but also because, as members of the society, each of us has a built-in need to achieve something in order to retain our own self-esteem. Each of us must live somewhere and must make contact with certain other people in order to satisfy our basic needs for food, protection from the weather, and a multitude of other acquired needs of civilization. In addition, having progressed beyond the very primitive, each of us must have a role, a place to belong and fit into the scheme of the society of people. We must earn, by our behavior, some approval and acceptance from others, and, most of all, we must have respect for ourselves. These things, then, require that we cope, actively and almost constantly, with an outer environment and that we learn how to do this without disintegrating inner anxiety.

There are ways of doing this; in fact, the ways are as infinite as the number of individuals who achieve a reasonably normal, healthy adjustment. There are people who are normal and do not realize it; there are people capable of finesse of adjustment who do not achieve it, simply because they fail to use and increase their potentials for growth, courage, and endurance. Contrary to some popular ideas, "normality," in my opinion, cannot be regarded as a state of nirvana in which one experiences no tension, no dissatisfaction, and therefore no drive to respond. These moments come rarely and briefly in a lifetime if at all. To live is to be under tension; to be dissatisfied; to be anxious, sometimes unbearably so; to be angry, sometimes potently and sometimes impotently; to be everlastingly hungry, to some degree, for things that may be consciously well defined or very vague; to become depressed and discouraged; to become physically or psychosomatically ill; to worry obsessively; and to become hysterically emotional. The range of normal functioning is wide and flexible. All of these reactions and many more can fall within it, provided they do not occur in intensity, frequency, duration, or quality that disorganizes ability to function with satisfaction in the environment. One "bad day" is different from a week of bad days, and both are exceedingly different in meaning from three consecutive months of them.

Perhaps the first step in resolving a problem, reducing a symptom, or living with a stress situation when we come across it is to take a long look at what is happening to us and make an honest effort to work it out ourselves, without the aid of a pill, a doctor, or an excuse. Help is often vital and necessary, but we cannot make judgments about this until we have investigated our own resources; we must know our resources and learn how to use them before we can use pharmaceutical or psychiatric help with our problems. The individual who cannot integrate and use his own strengths, or who is not motivated to do so, is difficult to help psychiatrically. Most important, he robs himself of the extremely maturing and satisfying experience of winning a battle by himself—a battle that will make the next one easier.

After a long look has been taken at the problem, the next step is fairly well outlined. Knowing the dimensions of his problem, an individual can consider the ways of handling it—changes in his own attitudes or behavior and the possible necessity for treatment or a pill. It is then time for a long look at himself, with or without help. The individual who gets this far is fortunate. Much has been written about self-knowledge and self-acceptance. Most often, those who fail to achieve this in some degree are those whose vision is obscured by impotent anger at the very state of being alive. They are resentful, complaining, negative, or simply "beaten." Self-acceptance is first based on acceptance of living as it really is, with its tensions and anxieties; it is based on giving up the illusion of nirvana and learning, by active giving of oneself, active participation, and active effort, the satisfactions of being under tension.

With an acceptance of living as it is can come a perspective of one's role and ways of responding both to positive and to negative experiences. There will always be many points of strength, areas in which one makes a positive, effective adjustment, "fits in," and thus gives and achieves satisfaction. Negative factors will also come to light—ways of responding which do not "make sense" in dealing most effectively with a situation but which, most likely, are based on highly individual and distorted

emotional and intellectual reactions. Once these factors are identified and the context of them understood, they can usually be modified so that the ways in which an individual makes life difficult for himself are reduced.

Therapy, then, is frequently self-therapy which takes place automatically and is based on established modes of reacting. It is what the normal person uses in dealing with every new experience. There ensues a systematic broadening and deepening in his response and participation with others, as well as in his own wisdom and emotional awareness. It is involved, in each person's every tiny adjustment to outer stimulation or to his own thoughts and feelings. The ways in which he responds and resolves these demands for response constitute his own personality patterns.

With a reasonable degree of acceptance of his environment, acceptance and understanding of himself, and motivation both to give and to receive richer experience, an individual consistently grows and can meet tensions without a pill or a major, enduring symptom. He makes flexible use of opportunities to deal with problems in many ways; he faces them, endures them, thinks about them, grows up, gets advice, blows off steam, or draws into himself for awhile. The important point is that he tries to make an appropriate choice of reaction, one which will achieve the greatest degree of adjustment in terms of himself and of the demands of reality, in the shortest period of time. If he must blow off steam—and this is acceptable and sometimes necessary—he usually chooses the right person, the right time, and the right intensity. His explosion is realistic in terms of the provocation and effective in resolving the situation that caused it. It does not relate to something else, some time in the past, with an intensity built up over years of not being able to assert himself when he should have.

Furthermore, he can accept ambivalence, by which I mean the essential undependability and paint-pot mixtures of his emotional reactions. Relationships with others, and even with a single person, will vary in warmth and intensity, so that there will be moments of deep empathy and moments of angry withdrawal. Often there will be mixtures of the two; each relationship will be different and will vary from day to day. Yet essential securities can be maintained in these relationships, provided an individual is secure and tolerant enough of himself and others to avoid excessive vulnerability to every breeze. Only the prevailing winds are important.

Where then is real tranquility? He who achieves it must be a person who is not synthetically relieved of all the pressures of everyday living and who very much feels the minor and normal tensions, anxieties, depressions, and dissatisfactions. He will expect, accept, and perhaps even enjoy the jolts and insecurities in this business of living. He will gamble, and probably win, because he will not expect to be rewarded by the calmness of inhabiting a vacuum. He will know when he feels angry, tired, happy, or blue, and it will not take him long to find out why. Sometimes he will show his feelings, partly, with control and appropriateness. He will want to solve his problems rather than avoid them, and he will actively seek those things he needs, rather than numbing away his dissatisfactions with a capsule or a tranquilizing pill. The supply of tranquilizers will be not in the bottle but inside himself.

There is no question but that outer stress, intense and constant as it is today, reduces the flexibility and security with which any of us can adjust. When a combination of stress and emotional immaturity result in inability to gain perspective on oneself, to accept life problems, to express emotions realistically and with control, to avoid rigidity of response, to accept ambivalent interpersonal relationships, or to "live with" anxiety and other symptoms, then realigning psychotherapy, with professional help, and perhaps a tranquilizing pill also, are indicated. This realignment of strengths merely consists of putting the right reaction, attitude, behavior, or feeling in the right place and in proper perspective to achieve the maximum effectiveness in adjustment. It is the old-fashioned kind of treatment that most of us can give ourselves; it is the old-fashioned tranquilizer, and the effect is enduring.

a salute to
medical school progress
MEDICAL EDUCATION
WEEK .... April 20-26

V 1
195

# THE PRESIDENT'S PAGE

## A MONTHLY MESSAGE

"Patients are human." To tell physicians this almost seems absurd, for we have spent our entire lives studying human beings, dealing with them, and helping them fight disease and death. Yet, how often do we forget that patients really are human?

"Patients are people who should be treated as whole human beings, not as parts of a mechanism." Again, we have read or heard this advice scores of times, yet how often do we refer to a patient as a "case," a "cardiac," or the "four-o'clock appointment"?

I believe, and undoubtedly most of you do too, that each patient must be considered as an extremely important individual and that the humblest patient must be given as much personalized care as the mightiest. No patient is an "ordinary" human being; nor is he an "average" man or woman. True, he may look unimportant to the world, but we know that he feels—or wants to feel—as important as anyone else. So when he comes to see us, by his own free choice, he must be treated as someone special. He must receive our personal attention as well as our scientific skill for his medical dollar, or he is almost certain to be a dissatisfied patient.

I further believe that we in medicine build confidence in our private practice system when we put real meaning into the doctor-patient relationship.

While our first responsibility is to our patients, and not to ourselves or our system of medicine, we can promote better doctor-patient relationships and the private practice of medicine at the same time if we cultivate and strengthen the traditional warm, sympathetic, and understanding approach to patients and their problems. In other words, how can we expect the public to be concerned for our struggle to keep medicine free if we first do not show respect, interest, and consideration for them as patients?

Hundreds of speeches and articles on the value and importance of the doctor-patient relationship will not help our cause if medical care is not personalized to the fullest extent. Thus, it is our responsibility to practice this kind of care in every personal contact between us and the patient—in the office, home, and hospital.

No physician, no matter what his specialty or how high his reputation, can exempt himself from the obligation of putting a large amount of medical art into his practice. Anyone who does fails his patients, his colleagues, and the future of the private practice of medicine.

Maybe this all sounds like an "old sermon," but I sincerely believe we can gain public support for our present medical system only by our individual actions in our daily practice. The written or spoken word can merely point out, or reemphasize, why our system is the best and how physicians are keeping it that way. However, words without the good actions of all physicians are meaningless for the public.

I personally do not believe there is a physician who is completely without some art to his medicine. The rendering of personalized care is not something new for any of us. Nevertheless, we must not approach personalized medical care in a hit-or-miss fashion. We must consciously make new and renewed efforts to provide all patients with the kind of individualized attention they demand or need.

It is my belief that in medicine our true glory is in our science and our true happiness is in our art!

David B. Allman, M.D.
Atlantic City, N. J.

# PROCEEDINGS OF THE PHILADELPHIA MEETING

## ABSTRACT OF PROCEEDINGS OF THE HOUSE OF DELEGATES OF THE AMERICAN MEDICAL ASSOCIATION AT THE CLINICAL MEETING IN PHILADELPHIA, DEC. 3-8, 1957

*The actions of the House of Delegates at the Philadelphia Meeting are abstracted below so that the readers may have this information in digest form. The official proceedings will be made available in a booklet which will be sent to all members of the House of Delegates and Officers of the American Medical Association.*—Ed.

The meeting of the House of Delegates in Philadelphia was called to order on Dec. 3, 1957, with an attendance of 192 delegates out of a possible 198.

**Awards and Citations.**—Dr. Cecil W. Clark of Cameron, La., was named the 1957 General Practitioner of the Year after his selection by a special committee of the Board of Trustees for outstanding community service.

Dr. Dwight H. Murray, Napa, Calif., immediate past-President of the Association, received the Navy Meritorious Public Service Citation, presented by Rear Adm. B. W. Hogan, Surgeon General of the United States Navy.

**Remarks of the Speaker.**—Dr. E. Vincent Askey, Speaker, in his address to the House, called attention to those who have voting privileges as well as those who have the privilege of the floor but who do not vote. He also mentioned the several rules in effect with respect to voting, introduction of old and new business and discussion of such business.

The Reference Committees as appointed by the Speaker are as follows:

**Amendments to the Constitution and Bylaws**

Leopold H. Fraser, *Chairman*, California
Kenneth C. Sawyer, Colorado
Millard D. Hill, North Carolina
George S. Klump, Pennsylvania
William D. Stovall, Wisconsin

**Board of Trustees and Secretary, Reports of**

Elmer G. Shelley, *Chairman*, Pennsylvania
Dwight L. Wilbur, California
James P. Hammond, Vermont
Harry L. Arnold Jr., Hawaii
Wendell C. Stover, Indiana

**Credentials**

A. A. Lampert, *Chairman*, South Dakota
Spencer Kirkland, Georgia
Edward B. Tuohy, Section on Anesthesiology
Stanley Weld, Connecticut
William Weston Jr., South Carolina

**Executive Session**

Vincent W. Archer, *Chairman*, Virginia
L. Howard Schriver, Ohio
Charles L. Shafer, Pennsylvania
Donald Cass, California
Dexter H. Witte, Wisconsin

**Hygiene, Public Health, and Industrial Health**

Raymond T. Holden, *Chairman*, Washington, D. C.
Cyril J. Attwood, California
Henry F. Howe, Massachusetts
E. P. Flood, New York
William F. Brennan, Pennsylvania

**Insurance and Medical Service**

William F. Costello, *Chairman*, New Jersey
Thomas McCreary, Pennsylvania
Milford O. Rouse, Texas
R. T. Johnstone, Section on Preventive Medicine
Thurman B. Givan, New York

**Legislation and Public Relations**

Percy E. Hopkins, *Chairman*, Illinois
Paul A. Davis, Ohio
Dan C. Ogle, United States Air Force
E. F. Hoffman, California
M. Shelby Jared, Washington

**Medical Education and Hospitals**

Jay J. Crane, *Chairman*, Section on Urology
Willard A. Wright, North Dakota
Grover C. Penberthy, Section on Surgery, General and Abdominal
Philip S. Foisie, Massachusetts
Francis C. Coleman, Iowa

**Medical Military Affairs**

Francis T. Holland, *Chairman*, Florida
H. Thomas McGuire, Delaware
H. Kenneth Scatliff, Illinois
John S. DeTar, Michigan
Donovan F. Ward, Iowa

**Miscellaneous Business**

Willis H. Huron, *Chairman*, Michigan
Frank A. MacDonald, California
Eugene Pendergrass, Section on Radiology
George F. Gsell, Kansas
Carl A. Lincke, Ohio

**Reports of Officers**

Durward G. Hall, *Chairman*, Missouri
Charles C. Smeltzer, Tennessee
Linwood Ball, Virginia
Jesse W. Read, Washington
Elmer P. Weigel, New Jersey

**Rules and Order of Business**

John N. Gallivan, *Chairman*, Connecticut
Walter C. Bornemeier, Illinois
Harold Gardner, Pennsylvania
James Q. Graves, Louisiana
J. Arnold Bargen, Minnesota

**Sections and Section Work**

Joseph B. Copeland, *Chairman*, Texas
Charles L. Leedham, Section on Military Medicine

V 1
195

RALPH E. CAMPBELL, Section on Obstetrics and Gynecology
WILKIE D. HOOVER, Oklahoma
NORMAN S. MOORE, New York

**Tellers**

EDWARD E. H. MUNRO, *Chairman*, Colorado
EARL MALONE, New Mexico
ALBERT T. SUDMAN, Wyoming
MILO H. FRITZ, Alaska
EDWARD ROSENOW, California

**Sergeants at Arms**

C. PAUL WHITE, *Master Sergeant*, Illinois
F. SANCHEZ-CASTANO, Puerto Rico
E. A. ALLEN, Georgia

**The recommendations of the various Reference Committees as reported in this abstract were adopted by the House of Delegates unless otherwise indicated.**

The Reference Committee on Reports of Officers, to which the remarks of the Speaker were referred, congratulated Dr. Askey on the model of efficiency and streamlining of the House of Delegates procedure, on the excellent advance planning with reference to the room arrangements, and on the new balloting arrangement at the June meeting. The committee urged the Speaker as a member, and the leader, of the House of Delegates to work constantly toward (*a*) maintaining equality of work in reference committee assignments even if special reference committees on the same subject would need to be appointed for specific considerations of the House; (*b*) making available the distribution of lengthy and studied reports prior to convening the House, thus alleviating the all too trying work of the reference committees; and (*c*) constantly seeking all possible liaison between the Board of Trustees and the A. M. A. officers and administration with the House of Delegates, while (*d*) re-emphasizing constantly that the House of Delegates is, in fact, the policy-making body of the Association.

**Address of the President.**—Dr. David B. Allman, President, delivered his address, which was referred to the Reference Committee on Reports of Officers. Dr. Allman called for "more freedom, not less, in America and in the medical profession." He urged the delegates to embark on local action campaigns to enlist full community support in opposition to the Forand bill, a pending Congressional proposal which would provide hospital and surgical benefits for persons who are receiving or are eligible for Social Security retirement and survivorship payments.

The Reference Committee on Reports of Officers agreed with the President that the basic freedoms of the American way of life are predicated on incentive and the free enterprise system is at stake; that positive action concerning the Forand bill, H. R. 9467, is needed; that there must be universal opposition against and that the time for action is now. It urged the profession to join forces with all possible agencies and spare no resources including monies and personnel in an immediate and all-out fight to stem the tide. (See also discussion under Supplementary Report N of Board of Trustees, below, page 1619.)

**Woman's Auxiliary.**—The President of the Woman's Auxiliary, Mrs. Paul C. Craig, addressed the House of Delegates, calling attention to the annual report of the Auxiliary (see THE JOURNAL, Oct. 26, 1957, pages 1048-1049) and stating that the Auxiliary has four projects for 1958: *Today's Health*, the American Medical Education Foundation, legislation, and safety.

The Reference Committee on Miscellaneous Business, to which the annual report was referred, expressed the gratitude of the House for the work being done by the Woman's Auxiliary and wholeheartedly approved the report.

**Report of Secretary.**—Dr. George F. Lull, Secretary, presented his report which was referred to the Reference Committee on Reports of Board of Trustees and Secretary (see THE JOURNAL, Oct. 26, 1957, pages 976-977).

The Reference Committee called attention to the substantial increase in membership over that of 1956 and commended Dr. Lull on his report, expressing warmest appreciation for his long years of invaluable service to the Association. The Committee also commended the value of the work done by Mr. Thomas A. Hendricks in the position of Field Director.

**Report of Board of Trustees.**—The Speaker referred items in the report of the Board of Trustees as printed in the Handbook of the House of Delegates (see THE JOURNAL, Oct. 26, pages 977-1024) as indicated below:

*Reference Committee on Reports of Board of Trustees and Secretary*

Matters Referred by House of Delegates
Distinguished Service Award
Annual and Clinical Meetings
Publications of the A. M. A.
Library
Law Department
Committee on Medicolegal Problems
Division of Councils of Therapy and Research
Bureau of Medical Economic Research
Directory-Biographical Department
Machine Records Systems Department

*Reference Committee on Legislation and Public Relations*

Committee on Legislation
Washington Office
Department of Public Relations

*Reference Committee on Hygiene, Public Health, and Industrial Health*

Council on Mental Health
Council on Industrial Health
Bureau of Health Education

*Reference Committee on Insurance and Medical Service*

Council on Rural Health

*Reference Committee on Medical Military Affairs*

Council on National Defense

*Reference Committee on Sections and Section Work*

Council on Scientific Assembly Bureau of Exhibits

**Matters Referred by House of Delegates.**—*New publication.*—The Reference Committee approved the request of the Board to defer action on resolution 1 (June, 1957) recommending the establishment of a new periodical publication designed to make known the activities and services of the A. M. A. to all people in the health field, pending evaluation of the effect of recent changes in the management and organization of *Today's Health*.

**Annual Meeting Place.**—No action was recommended on the selection of New York for the annual meeting of the Association in 1961 and San Francisco for 1962, inasmuch as it may not be possible to hold the 1960 annual meeting in Chicago as planned.

**A. M. A. Publications.**—The Reference Committee noted that THE JOURNAL and the specialty journals have enjoyed an increase in subscriptions, that the change to printing by commercial firms is being successfully accomplished; and that *Today's Health* has recently been placed under new editorial management with a substantial increase in advertising. The Woman's Auxiliary was particularly commended for its valuable efforts in behalf of *Today's Health*.

**Law Department.**—The Law Department was commended on the diversity of its work and the excellence of its report; particularly deserving of approval was its continued liaison maintained with the American Bar Association, both nationally and locally. Attention was called to the valuable activities of the Committee on Medicolegal Problems which are distinct from though closely correlated with those of the Law Department.

**Division of Councils of Therapy and Research.**—The reports of the councils and committees under the Division were carefully reviewed by the Reference Committee and approval was recommended. Attention was called to the proposed establishment under the Council on Medical Physics of a special committee on atomic medicine and ionizing radiations.

**Bureau of Medical Economic Research.**—The Reference Committee noted that the valuable and informative studies of the Bureau will continue to be made available to the members of the Association in separate bulletins or in THE JOURNAL.

**Directory-Biographical Department.**—Particular attention was called to the fact that the 20th edition of the Directory will be available in September, 1958; that machine methods of printing the Directory are being adopted as rapidly as possible, and that the Directory is self-supporting by reason of subscription fees to the semimonthly Directory Report Service.

**Committee on Legislation.**—The Reference Committee was favorably impressed with the new state legislative key man organization of the Committee on Legislation and recommended that the members of the House of Delegates promote the functioning of the plan within their own states and territories. The inclusion of the assistance of the Woman's Auxiliary in the consideration of legislative problems was heartily endorsed. Emphasis was given to the urgent need for all representatives of American medicine to be properly informed on pertinent legislative matters and the need for better channels of communication between the Committee on Legislation, the various state and county medical societies, and individual physicians.

**Washington Office.**—The Reference Committee noted that the Washington Office is functioning in a positive manner and believes that its activities are of considerable value to A. M. A. members. Statements presented to the committee indicated that the Washington Office staff is establishing valuable and constructive executive and legislative contacts, thereby fostering better and more cordial relations with national organizations in official Washington.

**Department of Public Relations.**—The Reference Committee believes that wholehearted effort is being made to present the ideals and policies of the A. M. A. to the general public by means of all acceptable news mediums and that the Department is following an effective program in an effort to control stories, advertising, and misinformation which might mislead the general public in matters of public and personal health. Attention was directed to the National Science Fair as a worthy project which merits continued support from state and county medical societies as a form of public information. Consideration was given to more effective methods of keeping the A. M. A. membership properly informed on all matters of interest to physicians, and the Reference Committee pointed out that the responsibility for properly indoctrinating new members belongs at the local rather than at the national level.

**Council on Mental Health.**—The Reference Committee called specific attention to the activities of the Council with respect to medical use of hypnosis, the preparation of a manual, based on articles which have been published in THE JOURNAL, for the use of physicians treating alcoholism, sponsorship of the Annual Conference of Mental Health Representatives of state medical associations, and continued support of the Joint Commission on Mental Illness and Health, Inc.

**Council on Industrial Health.**—The Council was commended for its diligence in so effectively performing all of its functions, especially the development of a statement on the "Scope, Objectives, and Functions of Occupational Health Programs," which was approved by the House of Delegates in June, 1957, and is to be distributed widely through approved channels to interested agencies.

**Bureau of Health Education.**—The Reference Committee complimented the personnel of the Bureau on the fine performance of their duties and drew the attention of the House to the activities of the director as a member of the President's Conference on the Fitness of American Youth. It was emphasized that physicians should cooperate in their communities with well-trained physical educators and educators as a whole who are as keenly aware of the danger of a run-away physical fitness campaign as are physicians. Close cooperation between the two groups should be fruitful in protecting the youth of the country against well-meant but excessive enthusiasms.

**Council on Rural Health.**—The Council was congratulated on an informative report and a successful year, with the expressed hope that all delegates would familiarize themselves with its various activities.

**Council on National Defense.**—After consideration of the report with respect to the abolition of the military veterinary corps the Reference Committee recommended that the House of Delegates reiterate its position opposing the abolishment of the military veterinary corps and that a copy of the action be transmitted to the Secretary of Defense and to the chairman of the Senate and the House Armed Services Committee. The Committee further recommended (*a*) approval of the research program and plan of study to establish criteria for the provision of medical care of the surviving population in the event of an enemy attack on the nation; (*b*) continuation of civil defense conferences; and (*c*) approval of the Council's action with respect to the dual vulnerability of federal employees. The Committee is in accord with the Cordiner study committee report which deals with the development of a program to attract and retain the combat leadership and the scientific, professional, technical, and management skills required by the armed forces today and in the future, provided it does not impair the effectiveness of the present career incentive provisions now authorized under the Career Incentive Program.

**Council on Scientific Exhibit.**—The Council was complimented on its utilization of many new audiovisual techniques and special features at the annual and clinical meetings of the Association, the rapid growth in the acquisition and use of films and the increased emphasis on scientific activities as suggested in the Heller Report. The Committee encouraged the acquisition of foreign films.

**Bureau of Exhibits:** Attention was called to the interest of the American public in medical and health exhibits and the sincere and successful efforts of the A. M. A. to meet the needs and increase the interest, as well as to the fact that health fairs constitute a very practical and successful way for physician and auxiliary members to make positive approaches to health education in their own communities.

### Supplementary Reports of Board of Trustees

Supplementary reports were presented to the House by title or by the Chairman, Dr. E. S. Hamilton:

**A. Dependent Medical Care.**—The Task Force on Dependent Medical Care, appointed by the Board of Trustees in June, 1956, presented a report of progress, calling specific attention to its conferences with representatives of the Office for Dependent Medical Care and the activities of its special committee in maintaining continuing liaison with that Office and the medical profession. The Task Force urged all to read the articles and reports appearing in THE JOURNAL, especially the one in the Nov. 16, 1957, issue captioned The Dependents' Medical Care Program (Public Law 569—84th Congress), on pages 1475-1483, which is in essence the report to Congress by the Office for Dependent Medical Care, giving operational data from the inception of the program to July 1, 1957. Arrangements were made for a conference to be held on Dec. 6, 1957, which will afford representatives of the state medical associations an opportunity to discuss not only their problems and questions but their desires with respect to the program.

The Reference Committee on Insurance and Medical Service recommended approval of the progress report and commended the Task Force for its efforts. It urged the Task Force to continue to keep state societies advised relative to the national program and to make every effort to appraise them with regard to new developments.

**B. Commission on Medical Care Plans.**—The Commission made its fifth progress report on its detailed activities and hopes to have a preliminary draft of its final report ready for consideration by the Commission at its meeting the latter part of January, 1958. It is hoped that the final report will be ready one month prior to the Annual Meeting in San Francisco so that it may be distributed to the delegates for review.

The Reference Committee on Insurance and Medical Service approved the progress report and hoped that the material developed by the Commission would be made available to the Committee on Relations with Lay Sponsored Voluntary Health Plans of the Council on Medical Service so that the work of this committee might be expedited.

**C. Confidential Nature of Hospital Staff Minutes.**—In accordance with action of the House of Delegates in June, 1957, on a resolution concerning the legal right of "directors of district hospitals" to examine the minutes of medical staff meetings and review the activities of medical staff committees, the Law Department submitted the following opinion: "It has long been held that the board of governors of a private hospital has the right to adopt rules and regulations relating to the qualifications and responsibilities of its staff members.

"As far as governmental hospitals are concerned, it has been held generally that governing boards may not adopt arbitrary rules, but may adopt rules and regulations that are reasonable, that tend to promote efficiency in the conduct of the hospital's affairs, and that are necessary to enable the hospital to fulfill better its obligations and duties to the public. . . . There is no reported court decision . . . involving the precise issue as to whether the medical staff of a public or private hospital may deny the board of governors access to its minutes.

"However, in the opinion of the Law Department, a resolution announcing a policy that the board of governors of a hospital should be denied access to the minutes of the medical staff would be a restriction upon the board's legal rights, duties, and obligations.

"Since the governing board is responsible for the care rendered by the hospital, it would appear that it has the legal right to adopt a rule permitting access to medical staff minutes by the governing board and knowledge of the activities of medical staff committees."

The Reference Committee on Medical Education and Hospitals recommended that the last paragraph of the report be deleted and replaced by the following: "The responsibilities of the governing board of a hospital does not abrogate the moral and legal responsibility of a physician for the medical care which he renders to his patient in the hospital."

**D. Neurological Disorders in Industry.**—In the area of neurological disorders the Council on Industrial Health and the Board of Trustees feel that a committee to study neurological disorders in industry, directed to developing valid and reliable information in keeping with the demands of the industrial physician, should be established as part of the Council on Industrial Health with membership from neurology and internal medicine.

Inasmuch as the industrial aspects of neurological disorders are nowhere well correlated for study by the multiplicity of existing agencies concerned with various nervous disorders, it seemed wise to the Reference Committee on Hygiene, Public Health, and Industrial Health to recommend a new committee to study neurological disorders in industry under the Council on Industrial Health.

**E. Guiding Principles for an Occupational Health Program in Hospital Employee Group.**—A joint committee of the American Medical Association and the American Hospital Association developed a set of guilding principles for an occupational health program for hospital employees, which have been formally approved by the A. H. A. The joint committee believes that employees in hospitals are entitled to the same benefits in health maintenance and protection as are industrial employees and that it is essential that employee health programs in hospitals be established as separate functions with independent facilities and personnel. The guides outline the desirability of an employee health service in a hospital, the considerations on which the success of such service depends, and the purpose, scope, personnel, and facilities required. (A copy of the guiding principles may be obtained by writing to the Council on Industrial Health, American Medical Association, 535 N. Dearborn St., Chicago 10).

Approval of the guiding principles as submitted was recommended by the Reference Committee on Insurance and Medical Service.

**F. Use of Fluoroscopes for Fitting of Shoes.**—The report recommended that for several reasons the Association discontinue the use of fluoroscopes for the fitting of shoes, particularly because technical studies have demonstrated that a high percentage of shoe-fitting fluoroscopes are frequently in poor repair and emit dangerous stray radiation, thereby exposing shoe sales personnel, customers, and bystanders to a hazard which they do not recognize or appreciate and which cannot be controlled effectively.

The Reference Committee on Hygiene, Public Health, and Industrial Health expressed complete agreement with the report of the Board.

**G. Fluoridation.**—A complete report on an exhaustive study of the subject of fluoridation of public water supplies was presented by a joint committee of the Council on Foods and Nutrition and the Council on Drugs, in accordance with the action of the House of Delegates at its meeting in Seattle, Nov. 27-30, 1956. The conclusions and recommendations of the joint committee were as follows:

1. Fluoridation of public water supplies so as to provide the approximate equivalent of 1 ppm of fluorine in drinking water has been established as a method for reducing dental caries in children up to 10 years of age. In localities with warm climates, or where for other reasons the ingestion of water or other sources of considerable fluoride content is high, a lower concentration of fluoride is advisable. On the basis of the available evidence, it appears that this method decreases the incidence of caries during childhood. The evidence from Colorado Springs indicates as well a reduction in the rate of dental caries up to at least 44 years of age.

2. No evidence has been found since the 1951 statement by the Councils to prove that continuous ingestion of water containing the equivalent of approximately 1 ppm of fluorine for long periods by large segments of the population is harmful to the general health. Mottling of the tooth enamel (dental fluorosis) associated with this level of fluoridation is minimal. The importance of this mottling is outweighed by the caries-inhibiting effect of the fluoride.

3. Fluoridation of public water supplies should be regarded as a prophylactic measure for reducing tooth decay at the community level and is applicable where the water supply contains less than the equivalent of 1 ppm of fluorine.

The Reference Committee on Hygiene, Public Health, and Industrial Health carefully reviewed the report and commended the two councils on their extensive study of the question and the excellent bibliography and tables appended to the report. The Committee was of the opinion that fluoridation of public water supplies is a safe and practical method of reducing the incidence of dental caries during childhood; it agreed with the conclusions of the joint committee of the two councils and recommended approval of the report. (The complete report may be secured at a nominal charge by writing to the American Medical Association, 535 N. Dearborn St., Chicago 10.)

**H. American Medical Research Foundation.**—An informational report relative to the establishment of a separate organization to be known as the American Medical Research Foundation was submitted by the Board, together with the Bylaws of the Foundation which outline the purposes, composition and details concerning its operation. In the opinion of the Board the Foundation has a great potential as an agency to initiate and encourage necessary medical research and to correlate and disseminate the results of studies already under way. It can receive funds from individuals, industry, or other foundations to finance beneficial medical research. The Board of Directors is composed of Drs. Leonard W. Larson, Hugh H. Hussey Jr., Raymond M. McKeown, Julian P. Price, and James Z. Appel.

The Reference Committee on Reports of Board of Trustees and Secretary noted with interest and approval the establishment of the American Medical Research Foundation and believes that it has great potentiality of future value.

**I. A. M. A.-A. H. A. Committee on Professional Liability.**—Pursuant to the recommendation of the Board and House of Delegates a joint committee was established with the American Hospital Association in an effort to devise an effective in-hospital medical professional liability prevention program. As a result of its first meeting, which was held in October, 1957, the committee recommended that (*a*) a detailed study be made of the group professional liability insurance program for hospitals which has been in effect in California for the past three years; (*b*) a review and report be prepared outlining the history, present status, and trends concerning the legal liability of charitable and municipal hospitals in cases involving professional liability; (*c*) the fourth film in the medicolegal series cover the subject of in-hospital professional liability prevention, and (*d*) the A. M. A. and the A. H. A. recommend to their constituent associations that joint medical and hospital liaison committees be appointed at the state level with purposes similar to those of the national professional liability committee.

The Reference Committee on Insurance and Medical Service approved the report and urged the state associations to take action as recommended in part (*d*) of the report.

**J. Civil Service Employees.**—In response to a question from the House of Delegates (June, 1957) as to whether Civil Service employees of government should, for occupational health purposes, be considered the same as are employees of private industry, the Board, in cooperation with the Council on Medical Service, reported that it believed that the "Scope, Objectives, and Functions of Occupational Health Programs," as approved by the House in June, 1957, should apply to all employee groups whether in private industry or in government.

The Reference Committee on Insurance and Medical Service recommended approval of the report.

**K. National Medical Research Fund.**—The Board of Trustees, following the June, 1957, meeting of the House of Delegates, referred resolution 20 on a National Medical Research Fund (introduced by the Ohio delegation) to the Committee on Relationships Between Medicine and Allied Health Agencies for study, inasmuch as the resolution proposed the establishment of a single national fund to finance medical research into all diseases, to be administered by physicians, such fund to be raised by contributions from united funds or similar charitable organizations throughout the United States. The Committee reported that a representative from the Ohio State Medical Association would be called in to explain the problems in Ohio and for that reason recommended that no action be taken on the resolution at this time.

The Reference Committee on Reports of Board of Trustees and Secretary recommended approval of the report as submitted.

**L. Suggested Guides to Relationships Between Medical Societies and Voluntary Health Agencies.**—The Board submitted guides developed by the Committee on Relationships

Between Medicine and Allied Health Agencies primarily for the guidance of local medical societies in their relationships with voluntary health agencies. The guides outline (*a*) the nature of voluntary health agencies; (*b*) voluntary agency evaluation; (*c*) mutual obligations between medical societies and voluntary health agencies; and (*d*) the role of physicians in relation to voluntary health agencies, which are summarized as follows:

1. The voluntary health agency is now a recognized community function, and most agencies merit medical society support of their objectives though the medical society, in some instances, might press for changes in policy or procedures.

2. Medical societies and voluntary health agencies have mutual obligations. Medical societies should participate and when desired give agencies advice and counsel on the medical and civic aspects of community needs. Voluntary health agencies should establish liaison with the medical society and frame their programs to conform to sound medical practice.

3. Physicians should support voluntary health agencies within their sphere of interest and recognize whether their role is as official representative of the medical society, interested physician, or private citizen.

The Reference Committee on Miscellaneous Business recommended that the proposed guides to relationships between medical societies and voluntary health agencies be enthusiastically approved.

**M. A. M. A.-A. B. A. Liaison Committee.**—In response to an invitation from the American Bar Association, the A. M. A. appointed three representatives to serve on a national medicolegal liaison committee. At the first meeting of the joint committee numerous projects were discussed, including professional liability, medical expert testimony, interprofessional codes of conduct, and national legislation. It was agreed that the first project should be the preparation of a national interprofessional code for the use and guidance of physicians and attorneys and also to assist state and county bar associations and medical societies interested in negotiating written codes of this type.

The Reference Committee on Miscellaneous Business wholeheartedly approved the report and encouraged further cooperation between the two professions.

**N. Forand Bill.**—The Board of Trustees appointed a special Action Committee to develop and to supervise the specific actions to be undertaken by the A. M. A. with respect to the Forand bill, H. R. 9467, 85th Congress. The bill would amend the Social Security Act to provide for federal subsidization of hospitalization and surgical medical care for retired and survivorship beneficiaries under Title II (OASDI) of the Act. The Board assured the House that every legitimate means would be taken to prevent the enactment of this undesirable legislation.

The Reference Committee on Legislation and Public Relations approved the firm positive position taken in opposition to this legislation and the action of the Board in appointing a special Task Force to defeat the Forand bill. (See also Address of President, above, page 000.)

**O. Medical Rating of Physical Impairment.**—The Board submitted a 115-page "Guide to the Evaluation of Permanent Impairment of the Extremities and Back," developed by the Committee on Medical Rating of Physical Impairment as the first in a projected series of guides, and called attention to its intention to publish these guides in THE JOURNAL for the information of the profession.

The Reference Committee on Hygiene, Public Health, and Industrial Health commended the Committee on Medical Rating of Physical Impairment for doing a superb job on this difficult subject and expressed pleasure that the guides will be published in THE JOURNAL.

**P. Scientific Assembly.**—The Board recommended that the Speaker of the House of Delegates appoint a committee of five, composed of three members of the House, one from the Board, and one from the Council on Scientific Assembly, to study the advisability of changes in the Bylaws of the Association as they pertain to the Scientific Assembly.

The House, acting as a committee of the whole, adopted the recommendation of the Board.

**Report of Judicial Council.**—The Speaker referred the report of the Judicial Council as printed in the Handbook of the House of Delegates (see THE JOURNAL, Oct. 26, 1957, pages 1024-1025) to the Reference Committee on Amendments to the Constitution and Bylaws.

The Reference Committee commended the report to the members of the House for serious study. It called attention to the fact that the 1957 edition of the Principles of Medical Ethics was not intended to and does not abrogate any ethical principle of the 1955 edition and endorsed the statement that if local societies fail to curtail unethical practices ethics lose their effectiveness. Failure on the part of the component society to demand respect for and adherence to the Principles breeds contempt and disrespect for them. The Committee also noted that the Opinions and Reports of the Council have been abstracted and annotated and believes that this document should receive wide distribution since it will be of assistance to medical societies when called upon to resolve ethical questions within their own jurisdictions.

**Report of Council on Medical Education and Hospitals.**—The Speaker referred the report of the Council on Medical Education and Hospitals as printed in the Handbook of the House of Delegates (see THE JOURNAL, Oct. 26, 1957, pages 1025-1033) to the Reference Committee on Medical Education and Hospitals.

The Reference Committee noted the over-all activities of the Council and referred the members of the House to the annual report. It called attention to the four annual special issues of THE JOURNAL which outline in minute detail the current status of medical education, medical licensure, and postgraduate and graduate medical education. On behalf of the delegates and members of the A. M. A. the Reference Committee extended to the Council sincere appreciation for its endless search for an ultimate definitive answer to the many controversial matters referred to them.

**Report of Council on Medical Service.**—The Speaker referred the report of the Council on Medical Service as printed in the Handbook of the House of Delegates (see THE JOURNAL, Oct. 26, 1957, pages 1033-1047) to the Reference Committee on Insurance and Medical Service.

The Reference Committee approved the reports of the eight committees of the Council (Aging; Relations with Lay Sponsored Voluntary Health Plans; Prepayment Medical and Hospital Service; Federal Medical Services; Medical Care for Industrial Workers; Maternal and Child Care; Indigent Care; Medical and Related Facilities), calling special attention to the following:

**Committee on Aging:** The recommendation that the House of Delegates urge every state medical association to create a committee on aging or to assign this problem to an existing

committee, as well as the closing paragraph of the report which reads: "It is understood that there have been a number of bills introduced into Congress for the purpose of creating a bureau of older persons. The Committee is of the opinion that the present methods of coordinating activities relating to aging within the federal government are adequate and, therefore, the Committee is opposed to the establishment of such a bureau. It is the understanding of this Committee that the Committee on Legislation of the A. M. A. is also opposed to the establishment of a special bureau."

**Federal Medical Services:** The Reference Committee emphasized the request of the Committee on Federal Medical Services that state and county medical societies establish formal plans, in accordance with the policy of the House, for seeing that veterans whose illness constitutes economic disaster will not be displaced by those suffering short-term remediable ills which, at the worst, constitute financial inconvenience, and urged state medical associations to report to the Council any activities in this regard. Attention was also called to the fact that the alleged abuses in Bexar County, Texas, were corrected but in recent months a change of post command resulted in the reinstitution of former practices of medical care for Civil Service employees. Appropriate steps are being taken to remedy the situation.

**Indigent Care:** Special attention was called to the recommendation that the House of Delegates urge every state medical association and county medical society to participate actively in the planning and operation of medical care programs for the indigent.

**Medical and Related Facilities:** Emphasis was given to the recommendation that the House urge the development of official liaison between medical societies and medical schools and that this mechanism be used whenever problems, questions, or policies arise that may concern the private practice of medicine or in which the medical profession may be of assistance to the schools. Liaison will not eliminate all problems, but it will avoid many and is certainly the only rational basis for solving those that do arise.

The Reference Committee expressed the hope that the Council will evolve a positive program to assure continued liaison on voluntary health insurance so that the Association may have an authoritative source for information on all kinds of insurance problems and may stimulate new developments in this field.

**Supplementary Report of Council on Medical Service.**—Inasmuch as some of the matters referred to in the annual report of the Council on Medical Service as it appeared in the Handbook were not completed, a supplementary report was submitted, abstracted as follows:

1. Guides for Evaluation of Management and Union Health Centers and the resolutions introduced by the Colorado delegation in June, 1956, and June, 1957. The Council recommended that the title be changed from "Guiding Principles for Evaluating Management and Union Health Centers" to "Guides for Evaluation of Management and Union Health Centers." It was further recommended that the last sentence of the third paragraph on page 6 of the Guides be deleted and that a change be made in the third paragraph on page 14 so that the sentence as revised would read: "As one aspect of this responsibility the health center is urged to provide a free choice of medical service to the patient it serves." The Council believed that the following paragraph on free choice of physician should not be included: "Eligible participants shall be given the opportunity, at the beginning of the period of their eligible participation, and at any time thereafter, to elect to receive their medical care from the Health Center Staff and Facilities or, in lieu of payment to the Health Center, assume the responsibility for providing their own medical care."

2. Preretirement Financing of Health Insurance for Retired Persons, a resolution introduced by the Pennsylvania delegation at the 1956 Clinical Session which referred to a plan prepared for the Commission on Geriatrics of the Medical Society of the State of Pennsylvania. The council felt that the Medical Society and its Commission should be commended for their interest and pioneering work in this important field but recommended disapproval of the proposed plan at this time because of (1) the inconsistency inherent in combining voluntary health insurance with a compulsory "social insurance" program; (2) the difficulties of implementation of the proposed plan; (3) lack of adequate and current statistical data; (4) the short length of time in which the voluntary health insurance plans have been experimenting with coverage for special population segments; (5) the indication of the decreasing number of aged without insurance coverage; and (6) the inability of an OASI-correlated plan to provide assistance to those older people who are most in need. It is acknowledged, nevertheless, that the medical profession has a particular interest in these problems and, along with its own sustained studies as well as with cooperation of employer groups, Blue Shield, insurance companies and other agencies, the Council recommends and encourages continued studies of the problems by the various state geriatric and insurance committees, with a view to gathering data on local problems and solutions. It welcomes the submission of suggested modes of action for the medical profession as a whole.

3. Veterans' Hometown Care Programs. Two resolutions on this subject introduced into the House of Delegates in June, 1957, were held in abeyance pending a survey being conducted by the Council. From the survey it was found that, of the 48 constituent associations replying, 10 have intermediary contracts under which a third party (usually the association itself or the state Blue Shield plan) administers the program and makes payments to the individual physicians. Four states have had intermediary contracts in the past but now have no contract. Twenty-two states have what might be called the "designated physician" method under which the Veterans Administration contracts with individual private physicians to provide care and the state association takes no part in the negotiations. Fifteen states have direct contracts with the VA under which the state association negotiates a fee schedule with the VA and provides a list of participating physicians, but the VA itself administers the plan and pays the individual physicians direct. From this it is evident that a majority of the states do not have the intermediary type of contract now in operation in California and Michigan. Since the House has no position endorsing any one of the three methods of implementing hometown care, the Council feels that a conference of state association representatives is essential; 28 states indicated they would be interested in attending such a conference.

4. Amendment to Social Security Act. In the Tennessee resolution (June, 1957) it was recommended that the Social Security Act be amended to require that any appropriation made by Congress for the care of the indigent sick of the state be allocated to the Public Health Service for reallocation to state health departments to avoid duplication of services. The Council recommended disapproval of the resolution because (1) the objective of the resolution can be achieved without an amendment of the Social Security Act since nothing in the present wording of the law prevents the state assistance agency from contracting with the state health department for administering medical care of Public Assist-

V 1
195

ance recipients; (2) the proposed amendment to the Social Security Act would impose on many states a system which is contrary to their present operating program and which would be unsatisfactory to the state medical associations; (3) some state departments of health would be opposed to undertaking this responsibility and many lack the administrative framework necessary for carrying out such a program; and (4) any effort to open up the Social Security Act to amendments having to do with medical care is unwise at this time.

5. Memorial to Dr. Fitzgibbon. The Council paid special tribute to Dr. J. H. Fitzgibbon, a member of the Council from 1943-1946, for his dynamic work and for his continuing interest and guidance long after termination of his official ties with the Association.

The Reference Committee on Insurance and Medical Service approved the recommendations of the Council in items 1, 2 and 4 of its supplementary report. With respect to item 3 on the VA medical care program, the Reference Committee reported that it had been informed that the Board of Trustees and the Council, through the Committee on Federal Medical Services and appropriate departments of the A. M. A., are taking steps to implement the policy of the A. M. A. with respect to VA medical care. Every effort will be made to achieve the fundamental A. M. A. objective of bringing about economy in the VA medical care program by restricting government's responsibility to veterans whose disabilities are clearly related to military service.

**Committee on Medical Practices.**—The Speaker referred the report of the Committee on Medical Practices as printed in the Handbook of the House of Delegates (see THE JOURNAL, Oct. 26, 1957, pages 1051-1052) to the Reference Committee on Miscellaneous Business.

The Reference Committee called attention to that portion of the report referring to the development of a relative value schedule for diagnostic, medical, and surgical services and a program of public education designed to bring about a better understanding of all fields of medical practice, remarking that this forms an excellent basis for continued study. The Committee stated that the Committee on Medical Practices deserved the whole-hearted cooperation and assistance of every member of the A. M. A. in its work on this difficult problem. The Committee further recommended that the term "relative value study" be used in lieu of "relative value schedule" as being less confusing.

**Supplementary Report:** The Committee on Medical Practices submitted three recommendations in a supplementary report, i. e.: (1) that the House of Delegates endorse the idea of the development by the Committee of a relative value schedule of medical and surgical services and at the present moment suggested the California scale as a good example because of its specific reference to the values of diagnostic and medical services as well as surgical services; (2) that the House of Delegates take definite action condemning the practice on the part of spokesmen for tangent medical groups or individual physicians of making public statements, verbal or in print, that are detrimental to public confidence in doctors; and (3) that the Department of Public Relations and the Bureau of Health Education of the A. M. A. take special cognizance of the objectives of the Committee on Medical Practices in their liaison with science writers and other writers in the medical field.

The Reference Committee on Miscellaneous Business recommended that no action be taken on the supplementary report.

**Woman's Auxiliary.**—The Speaker referred the report of the Woman's Auxiliary as printed in the Handbook of the House of Delegates (see THE JOURNAL, Oct. 26, 1957, pages 1048-1049) to the Reference Committee on Miscellaneous Business.

The Reference Committee expressed gratitude to the Woman's Auxiliary for the work it is doing and wholeheartedly approved the report.

**American Medical Education Foundation.**—The Speaker referred the report of the American Medical Education Foundation as printed in the Handbook of the House of Delegates (see THE JOURNAL, Oct. 26, 1957, pages 1049-1051) to the Reference Committee on Miscellaneous Business.

The Reference Committee referred to the many articles appearing in support of the Foundation, such as the one which appeared recently in *California Medicine*, calling attention to the tax-deductible features accruing to contributions to foundations of this type. Testimony before the Reference Committee emphasized the appreciation of the medical college deans for the contributions which they received and for the fact that they are given without restriction. With grateful appreciation the Committee approved the report of the Foundation.

**Committee to Study Heller Report.**—The Chairman of the Committee to study the Heller report on organization of the American Medical Association, appointed by the Speaker after the June, 1957, meeting of the House of Delegates, reviewed the activities of the committee in arriving at its report. Comments were made on several matters in the Heller Report which are administrative or executive and which are under the direction of the Board of Trustees or General Manager, but no definite recommendations regarding these items were made. The Committee, however, transmitted the following recommendations for House action:

(1) The office of Vice President be continued as an elective office.

(2) The offices of Secretary and Treasurer be combined into one office to be known as Secretary-treasurer, and that the Secretary-Treasurer be selected by the Board of Trustees from one of its number.

(3) The duties of Secretary-Treasurer be separated from those of General Manager (or Executive Vice President).

(4) The position of Executive Vice President be substituted for that of General Manager, the Executive Vice President to be appointed by the Board of Trustees as the Chief Staff Executive of the Association.

(5) The Council on Medical Education and Hospitals and the Council on Medical Service continue in all respects as standing committees of the House of Delegates as they presently are.

(6) The voting members of the Board of Trustees be limited to eleven, namely, the nine elected Trustees, the President and the President-Elect. The Vice President and the Speaker and Vice Speaker of the House of Delegates shall attend all meetings, including executive sessions, of the Board with right of discussion but without the right to vote.

(7) One Trustee be elected from each of the nine physician-population regions proposed in the Heller Report.

(8) Assistant Executive Vice President be substituted for Assistant to the Executive Vice President in the Heller Report, and also for the present position of Assistant Secretary.

(9) The Heller Report recommendation that the Committee on Federal Medical Services should be a part of the Council on National Defense be disapproved. This Committee should be retained as a committee of the Council on Medical Service as it is at the present time.

(10) In connection with one of the general recommendations that there be a redefinition of the central concept of the A. M. A. objectives and basic programs, your Committee

is well aware that much has been and is being done, but the Committee feels the matter must be continually emphasized. While much time, energy and money is spent in an all-out fight against socialized medicine, it has seemed that in our basic policy the obvious fact that medical freedom cannot long endure as an island in a sea of collectivism has been overlooked. It should be emphasized that freedom is indivisible and that where one segment of our economic, social, political or religious structure is in any manner denied its justifiable freedom, every segment is thereby injured.

As a large and influential organization, the American Medical Association has a wonderful opportunity to take the lead in a restatement of the fundamentals underlying our private competitive enterprise system and the incomparable benefits it confers upon everyone living under its sway. We could thus give courage to those who have despaired of ever achieving a return to sane economic, social, political and religious reasoning.

To formulate such a policy and to present it as living embodiment of the ideals of the American Medical Association, it is recommended that the Speaker of the House of Delegates immediately appoint a Continuing Committee on Socioeconomic Policy, this committee to consist of five members, the initial terms of two to be three years, two, two years, and one, one year. This committee shall cooperate and coordinate its activities with the Board of Trustees and report its findings and recommendations to the House of Delegates.

The Reference Committee on Amendments to the Constitution and Bylaws approved recommendations 1, 2, 3, 4, 6, 8 and 9 of the Committee to Study the Heller Report. Revisions were made in the other recommendations as follows:

(5) The Reference Committee agreed with the recommendation that the Council on Medical Education and Hospitals and the Council on Medical Service should continue in all respects as standing committees of the House of Delegates as they presently are but recommended further that the administrative direction of these councils be vested in the Executive Vice President.

(7) The Reference Committee recommended disapproval of the election of Trustees from each of the nine physician-population regions proposed in the Heller Report.

(10) The Reference Committee recommended the establishment of a joint and continuing committee of six, three from the Board of Trustees and three from the House of Delegates, appointed by the Speaker. Their duties would be to consider (*a*) redefinition of the central concept of A. M. A. objectives and basic programs; (*b*) placing more emphasis on scientific activities; (*c*) taking the lead in creating more cohesion among national medical societies; and (*d*) studying socioeconomic problems.

The Reference Committee further recommended that the recommendations accepted by the House be referred to the Council on Constitution and Bylaws with a request that it draft appropriate amendments for the consideration of the House at the San Francisco meeting in June, 1958.

(to be continued)

## COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

### POSTGRADUATE COURSES

Notice of the following postgraduate courses for practicing physicians has not previously been published by the Council and is presented for information only:

A one-day program, entitled **The Role of the Obstetrician and the Pediatrician in the Prevention of Neonatal Mortality and Morbidity,** will be presented in Colorado Springs April 18, 1958, by the University of Colorado School of Medicine. Three panel discussions will be offered, at a fee for registration of $15. Further information may be obtained from the Office of Postgraduate Medical Education, University of Colorado School of Medicine, 4200 E. Ninth Ave., Denver 20.

An intensive course in **Applied Epidemiology** for public health physicians will be offered May 5-9, 1958, at the Communicable Disease Center, U. S. Public Health Service, Atlanta, Ga. Lecture-discussion sessions, with use of audiovisual aids as well as seminars, are the educational methods to be used. Further information may be obtained from Chief, Communicable Disease Center, U. S. Public Health Service, 50 Seventh St., N.E., Atlanta 23, Ga., attention of Chief, Training Branch.

An intensive two-day course in **Hemolytic Disease of the Newborn** is scheduled for June 5-6, 1958, at the Children's Hospital of Philadelphia. Panel discussions, demonstrations, conferences, and case presentations will occur, with a registration fee of $50. Further information may be obtained from Dr. Irving J. Wolman, Children's Hospital of Philadelphia, 1740 Bainbridge St., Philadelphia 46.

An intensive continuous laboratory and lecture course in **Techniques and Applications of the Electron Microscope** will be offered to qualified senior biologists and medical research workers at the Electron Microscopy Laboratory, Cornell University, June 16-July 3, 1958. Application may be made to the Director, Electron Microscopy Laboratory, Rockefeller Hall, Cornell University, Ithaca, N. Y.

A course for practicing physicians, **Modern Methods in the Recognition and Treatment of Heart Disease,** will be given June 23-25 at New York University Postgraduate Medical School, 550 First Ave., New York 16. Further information may be obtained from the Associate Dean of the School.

The University of Cincinnati College of Medicine will present at the School and at Cincinnati General Hospital an intensive, continuous, one-week course for specialists in otolaryngology, **Reconstructive Surgery of the Nasal Septum and External Nasal Pyramid,** April 12-19. Eleven hour sessions daily will utilize lectures, surgical demonstrations, anatomic exercises, seminars, and case presentations. Further information may be obtained from the Department of Otolaryngology of the School.

# MEDICAL NEWS

## ILLINOIS

**Hospital News.**—The seventh lecture in the eighth annual North Shore Hospital lecture series on "The Emotional Problems of Childhood" will be held in Winnetka April 2, 8 p. m. "Management of the Delinquent" will be discussed by Dr. Joseph J. Michaels, instructor in psychiatry, Harvard Medical School, Boston. The Commission on Education of the American Academy of General Practice has approved these lectures for category II credit. Physicians and allied professional personnel are invited.

**New Medical Center in Hinsdale.**—Construction has been completed on the one million dollar Hinsdale Medical Center, sponsored by the Kettering Family Foundation, and the building is now being occupied by more than 23 physicians and dentists. There is space for a medical library, and a health museum and health theater, designed "to further the education of the public in the areas of health

New Medical Center in Hinsdale

and hygiene." These will be open to the public on or about May 1. The tri-level, air conditioned building will also include an x-ray and pathological laboratory, a prescription pharmacy, an optical dispensary and a stenographic service. The Health Theater will be used for lectures by members of the medical profession, and open to the public. The center is the first major project of the Kettering Family Foundation, a not-for-profit corporation organized in December, 1955, for the purpose of carrying on charitable, educational, civic, scientific, and research projects.

### Chicago

**Medical History Lecture.**—The annual D. J. Davis Memorial Lecture on Medical History will be given at 1:00 p. m. April 16 in room 221 in the Dental-Medical-Pharmacy Building, University of Illinois. The lecturer will be Ilza Veith, Ph.D., of Chicago, who will speak on "Oriental Medicine and its Concepts of the Soul." Dr. Veith is the president of the Society of Medical History.

**Personal.**—Dr. Josiah J. Moore, who is serving his 15th year as treasurer of the A. M. A., was recently elected president of the Institute of Medicine of Chicago, the membership of which numbers 600, and is by invitation.

**Society News.**—The Chicago Dermatological Society has elected the following officers: president, Dr. Samuel M. Bluefarb; vice-president, Dr. I. Myron Felsher; and secretary-treasurer, Dr. Frederick J. Szymanski, 55 E. Washington St.

**Reunion for 1913 Rush Alumni.**—Dr. Ralph H. Kuhns, of the Veterans Administration Regional Office, Chicago, is arranging for the 45th anniversary reunion of the class of 1913, Rush Medical College, to be held in Chicago during the weekend before the A. M. A. convention. Headquarters will be at the Hilton Hotel and the University Club. A second reunion will be held during the convention for the West-Coast alumni. For information write Dr. Ralph H. Kuhns, Suite 1445-A, The Conrad Hilton Hotel, Chicago 5.

## INDIANA

**Citations for Work with the Handicapped.**—Drs. Kendall R. Manning, of Indianapolis, and Eli S. Jones, of Hammond, were presented citations at a meeting of the Council of the Indiana State Medical Association by Dr. Emmett B. Lamb, of Indianapolis, representing the Governor's Commission on the Employment of the Handicapped. The citations carry with them nominations for national physicians of the year for work with the handicapped, an award made yearly by the President's Committee for Employment of the Handicapped "in public recognition for exceptional contributions toward public understanding and acceptance of the physically handicapped in employment." Dr. Manning is associate professor in orthopedic surgery at the Indiana University Medical Center. He has been medical director of Crossroads Rehabilitation Center, Indianapolis, since his return from the Air Force in 1952. Dr. Jones is a past-president of the Industrial Medical Association and serves several

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

companies in the Calumet Area as an industrial physician. He is a delegate to the American Medical Association.

## MASSACHUSETTS

**Medical Research Building.**—As a new step in its long-range development program, Boston University's board of trustees has voted to match a federal grant in the amount of $1,500,000 for the construction of a $3,000,000 medical school research building. The university will embark on an immediate campaign to raise the matching funds in order that construction of a building devoted to research in clinical and basic medical sciences may be started early in 1959. President Harold C. Case, LL.D., in announcing the trustees' action indicated that the new research building will involve several floors and a basement. A medical research building committee, headed by Dr. Henry M. Lemon of Weymouth, Mass., has been established at the medical school.

**Seminar on Biliary Surgery in Boston.**—The Third (Boston University) Surgical Service Fifth Annual Seminar, on "Biliary Surgery," will be held April 9 at Dowling Amphitheatre, Boston City Hospital. The program includes the following papers by out-of-state speakers:

Intrahepatic Choleostasis, Dr. Carroll M. Leevy, Seton Hall College of Medicine, New Jersey.

Liver Decompression by Common Bile Duct Drainage in Subacute and Chronic Jaundice, Dr. Alfred A. Strauss, Strauss Surgical Group, Chicago.

Tumors of the Gall Bladder and Biliary Tree, Dr. Richard C. Britton, Cleveland Clinic Foundation, Ohio.

Hepatic Lobectomies, Dr. Alexander Brunschwig, Cornell University Medical School, New York City.

Residual Common Duct Stones, Dr. N. Frederick Hicken, University of Utah College of Medicine, Salt Lake City.

Application of Embryological Studies to Bile Duct Surgery, Dr. Mark A. Hayes, Yale University School of Medicine, New Haven, Conn.

For information write Dr. John J. Byrne, Director, Third (B. U.) Surgical Service and Research Laboratory, Boston City Hospital, Boston.

## NEW MEXICO

**Physicians Take Stand on Welfare Issue.**—The New Mexico Medical Society, has had its offer accepted by the state's welfare department to render free medical care to welfare patients rather than accept a further reduction in payments from the welfare fund. The schedule originally accepted by physicians represented one-fourth of a doctor's usual fee. The offer for free medical care came after the state's department of public welfare claimed that because of a gradual increase in the number of patients the medical pool fund, established in 1952 with state and federal money, was running low. The fund is used to provide medical, surgical, hospital, dental, and nursing care and drugs for welfare patients. The new offer is effective from Jan. 31 to June 30, at which time the physicians will meet with welfare department officials and review the experience.

## NEW YORK

**Dr. Wertz Honored.**—Dr. Carlton E. Wertz, a member of the A. M. A. House of Delegates and architect of Blue Shield's "service-type" contract for prepaid medical care, was recently selected by the Buffalo *Evening News* as one of nine "Outstanding Citizens for 1957." Selections were made by the editors from nominations submitted by the public and members of the News staff. Dr. Wertz has been a member of the A. M. A. Council on Medical Service since 1952, and was president of the Medical Society of the State of New York in 1950-1951.

### New York City

**Lecture on Cardiovascular Disorders.**—The second Bernard Sutro Oppenheimer lecture will be given in Hosack Hall of the New York Academy of Medicine April 3, 8:30 p. m., by Dr. Gunnar W. Biörck, associate professor of clinical medicine, University of Lund, and head, division of cardiology, department of medicine, Malmö General Hospital, Malmö, Sweden. Dr. Biörck's subject will be "Environment and Cardiovascular Disorders."

**Dr. Taylor to Succeed Dr. Rappleye as Dean.**—Dr. Howard C. Taylor Jr., chairman, department of obstetrics and gynecology, Columbia University, will succeed Dr. Willard C. Rappleye, who has been dean of Columbia's Faculty of Medicine and College of Physicians and Surgeons since 1931, and vice-president for medical affairs since 1949. Dr. Rappleye will retire on June 30. Dr. Taylor has taught at the University of Pennsylvania and at New York University, and has occupied his present post at Columbia since 1946. He is editor of the *American Journal of Obstetrics and Gynecology*, a director of the American Cancer Society, and president of the American Gynecological Society.

## NORTH CAROLINA

**New Program in Nursing Education.**—Duke University will inaugurate a master's degree curriculum in nursing with the partial support of a seven-year grant of $238,000 from the Rockefeller Foundation. The one-year course is designed for nursing educators, administrators, and supervisors. Its primary aim is to focus the attention of students on the content of what they will have to teach or supervise in their subsequent careers rather than on the techniques of teaching. A large amount of ward experience will be a requirement of the curriculum, as well as classes in the basic sciences and in ad-

ministration. Sixteen Southern states now have sixteen nursing schools at the college level. Master's degree preparation is available at only four of these institutions.

## OHIO

**Dr. Lull to Give Memorial Address.**—Dr. George F. Lull, Chicago, Secretary, American Medical Association, will be the guest speaker at the Whitacre Memorial Address, sponsored by the Cleveland Society of Anesthesiologists. His talk is entitled "The Regulated Practice of Medicine." It will be given at a dinner meeting at the Wade Park Manor in Cleveland April 23. Interested persons should contact Dr. Sidney W. Helperin, 20665 Century Way, Maple Heights, Ohio.

**Plan to Organize Dermatological Society.**—The Noah Worcester Dermatological Society is a new organization formed by the department of dermatology, University of Cincinnati College of Medicine, "to sponsor scientific meetings and foster reunions of former residents and fellows, members of the faculty and members of the Cincinnati Dermatological Society." Because of the wide geographic distribution of former residents and fellows, annual meetings will be held in areas other than Cincinnati. Membership will be open to graduate dermatologists, residents, and fellows in dermatology and graduate degree scientists in other fields, regardless of any association with the University of Cincinnati. The organization and founders meeting of the society will be held at Eden Roc Hotel, Miami Beach, Fla., April 23-27. Executive and scientific sessions are planned. Organization committee members are: Drs. Donald J. Birmingham, Mitchell Ede, Leon Goldman, Edwin L. F. Higgins, Daniel J. Kindel, H. Jerry Lavender, Harry A. Nieman, Robert H. Preston, John B. Squires, Raymond R. Suskind, and Alfred L. Weiner. The society has been named for the author of the "first American textbook of dermatology," printed in Cincinnati in 1850, entitled "A Synopsis of the Symptoms, Diagnosis and Treatment of the More Common and Important Diseases of the Skin."

## OKLAHOMA

**Plan Professional Building in Tulsa.**—Construction of a medical and dental office building in Tulsa was announced recently by Dr. Arnold H. Ungerman, president of the Twenty-First Street Building Corporation. To cost $1,250,000, the new structure is a cooperative venture by a group of Tulsa physicians and dentists. The building will accommodate 60 professional men and will contain 65,000 square feet of floor space. Walls will be of insulated porcelain steel panels, and structural columns and windows will be aluminum covered. Each suite is designed to the individual requirements of the tenant. Complete pathology and x-ray laboratories will include isotope and cobalt-bomb therapy equipment. Other members of the board of directors of the corporation are Drs. Erma O. Johnson, Jesse D. Shipp, Robert M. Shepard Jr., Harold A. White, Robert E. Nathan, Emanual N. Lubin, and Dave B. Lhevine.

## TEXAS

**Dallas Physicians in C. of C.**—The Dallas Chamber of Commerce has more physician members than any other chamber of commerce in the United States. Membership of physicians in the Dallas chamber has grown from 92 in 1953—to a total of 340 in 1958, with 34 actively serving on committees.

**Dr. May Owen Honored by Pathologists.**—Dr. May Owen, of Fort Worth, has received the Caldwell award of the Texas Society of Pathologists, the top award of the society. Dr. Owen is the first woman to receive the award, and also the first woman to serve as president of the local medical society.

## VERMONT

**State Society Bequeathed Fund for Needy.**—The portion of Mrs. Marianne G. Faulkner's will referring to the Vermont State Medical Society reads as follows: "(e) To Vermont State Medical Society, a corporation of the State of Vermont, the sum of one hundred thousand dollars ($100,000), to be kept as a permanent fund to be known as the Edward Daniels Faulkner and Marianne Gaillard Faulkner Fund and the income only to be used (a) for the relief of pecuniary distress of sick or aged members or the parents, widows, widowers, or children of deceased members, and (b) for the relief of pecuniary distress of members resulting from catastrophic natural causes."

## WISCONSIN

**Personal.**—Dr. Philip P. Cohen, chairman, department of physiological chemistry, University of Wisconsin Medical School, Madison, will go to Oxford, England, in April under the auspices of a Commonwealth "special award in support of basic research." During the six months he will be at Oxford, he will do basic research in the biochemical aspects of inflammation.—Dr. Henrik A. Hartmann, department of pathology, University of Wisconsin Medical School, has been invited by Prof. Viktor H. Hydén, of the University of Göteborg Medical School, in Sweden, to visit that university and do investigative work on nerve cells. Prof. Hydén directs an institute specializing in spectrophotometry and cytochemistry in nerve cells. Dr. Hartmann will return July 1.

**University News.**—The Alpha Psi Chapter of the Phi Delta Epsilon Fraternity at the University of Wisconsin will hold its annual Arthur S. Loevenhart Lectureship April 1. The guest speaker will be

Dr. Harold E. Himwich, director of the Research Division of Galesburg State Research Hospital, who will discuss "Tranquilizing Drugs in Modern Medicine."—Prof. Jerzy Konorski, professor of Neurophysiology, The Nencki Institute of Experimental Biology, Warsaw, Poland, visited the University of Wisconsin Medical School, Madison, during the week of Feb. 9-15, under the Cultural Exchange Program, now being sponsored by the State Department.—Dr. Walter Artelt, of Frankfurt, Germany, is visiting professor in the history of medicine, University of Wisconsin Medical School, Madison. Dr. Artelt is the director of the Institute for the History of Medicine at the University of Frankfurt, Frankfurt on the Main.

## GENERAL

**Fellowships for Research in Nutrition.**—Six fellowships at $200 a month for three months are being offered by the Nutrition Foundation, in cooperation with the A. M. A. Council on Foods and Nutrition, "in an effort to stimulate medical school staff members and students to take a more active interest in the science of nutrition." The fellowships are being given in honor of Dr. Paul Gyorgy, recipient of the 1957 Goldberger award in clinical nutrition. For information write the Council on Foods and Nutrition, A. M. A., 535 N. Dearborn, Chicago 10.

**Clinical Surgery Meeting in St. Louis.**—The 98th meeting of the Society of Clinical Surgery will be held April 4-5 in St. Louis, with headquarters at the Park Plaza Hotel. The scientific program will be held at Wohl Auditorium, Wohl Hospital, April 4 and at the Cardinal Glennon Memorial Hospital for Children April 5. About 25 papers are scheduled, including an address by Dr. James W. Colbert Jr., dean, St. Louis University School of Medicine. A ladies' program is arranged, including a tour April 4. For information write Dr. Frank F. Allbritten Jr., Secretary, The Society of Clinical Surgery, University of Kansas Medical Center, Kansas City 12, Kan.

**Border Public Health Meeting in El Paso.**—The 1958 annual meeting of the United States–Mexico Border Public Health Association will be held April 8-11 at the Hotel Cortez, El Paso, Texas. Addresses will be presented by the following: Mayor Raymond L. Telles, of El Paso; Mayor René Mascarenas, of Juarez, Chihuahua, Mexico; Dr. Henry A. Holle, commissioner of health, Texas State Department of Health, Austin; and Dr. Ignacio González Estavillo, chief, Department of Coordinated Health Services in the State of Chihuahua. Dr. Malcolm H. Merrill, president of the association and director, State of California Department of Public Health, Berkeley, will present "Public Health Mission to Russia" the evening of April 8. A panel discussion and a seminar on diarrheal diseases are planned for the morning of April 9. A discussion on "Recent Advances in Communicable Diseases" will be held at the final general session April 11. For information write the U. S.-Mexico Border Public Health Association, 243 U. S. Court House, El Paso, Texas.

**Jaycees Sponsor Community Health Program.**—The U. S. Junior Chamber of Commerce announces that its 3,000 local chapters are embarking on a year around community health program, developed in cooperation with the National Health Council. Program guides have been prepared for each of 10 suggested activities: Salk Vaccine Campaign; Health Fair; Better Sight and Hearing for Children; Poison Control; Assistance to Mental Health for Youth; Adventures in Living for Older People; Help for Handicapped Children; Recreation for Mental Hospital Patients; Jaycee Health Forums; and Directory of Health Services. The activities in local communities will not be limited to the 10 programs, however. Jaycee leaders are urged to get in touch with local medical societies and health agencies.

**Anatomists Meet in Buffalo.**—The American Association of Anatomists will meet in Buffalo, N. Y., April 2-4. The program of 295 papers includes the following:

Development of the Otic Capsule and the Auditory Ossicles in Man, Barry J. Anson, Ph.D., Northwestern University Medical School, Chicago.

Morphological Classification of Vertebrate Blood Capillaries, Dr. Henry Bennett, University of Washington, Seattle.

Regeneration of Axons Across Gaps in the Transected Spinal Cords of Adult Rats, Charles R. Noback, Ph.D., Columbia University, New York City.

An Orally Active Non-Steroidal Compound with Antifertility Effects in Rats, Sheldon J. Segal, Ph.D., New York City.

Induction of Lactation in the Human Female by Pituitary Stalk-Sections, Dr. Nylene E. Eckles, Texas Medical Center, Houston.

Modulation of Cell Types in Liver Injury and Repair, James W. Wilson, Ph.D., Brown University, Providence, R. I.

For information write Dr. Oliver P. Jones, Program Secretary, The American Association of Anatomists, Department of Anatomy, School of Medicine, University of Buffalo, 3435 Main St., Buffalo 14, N. Y.

**New England Rural Health Conference.**—The third annual New England Rural Health Conference will be held April 10 at the University of New Hampshire Memorial Union, Durham, N. H., sponsored by the Council of New England State Medical Societies and the Council on Rural Health, American Medical Association. Dr. Arthur W. Burnham, of Lebanon, president, New Hampshire Medical Society, will open the meeting at 9:30 a. m., and Dr. Norman H. Gardner, East Hampton, Conn., regional director, Council on Rural Health, A. M. A.,

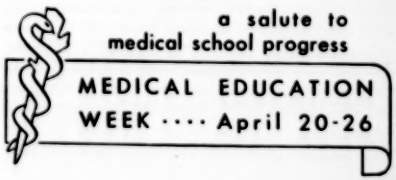
will give an address. "New Trends in Care of the Crippled and Chronic Among Us" will be presented by Dr. Richard J. Clark, director, Cardiac Work Classification Unit, Massachusetts Heart Association, Winchester, Mass. A film, "How to Manage a Home Though Handicapped," will be shown at 10:30. After luncheon, Mrs. Charles W. Sewell, Member of the Advisory Committee, Council on Rural Health, A. M. A., will present "Progress in American Rural Health." A panel discussion, "New Horizons in Mental Health," will precede the concluding address by Mr. Aubrey D. Gates, Field Director, Council on Rural Health, A. M. A.

**Announce Award for Medical Writing.**—The editors of *Modern Medical Monographs*, a quarterly publication, have announced an award for the "best unpublished manuscript for a short book on a clinical subject in the field of internal medicine." The purpose of the "Modern Medical Monograph Award" is to "stimulate young physicians to communicate their work in the classical form of the monograph and to achieve high standards of medical writing." The winner will receive $500. The winning monograph, if found suitable, will be published as a book in the series Modern Medical Monographs. The author must be a graduate physician, less than 40 years of age. Single authorship is preferred, but two co-authors will be acceptable. The medical school from which the author graduated and the date of graduation should be stated. Manuscripts should be submitted in duplicate by registered mail, postmarked no later than Oct. 1, to Dr. Richard H. Orr, 37 E. 67th St., New York 21. The manuscript, including the bibliography, must consist of between 115 and 200 double-spaced typewritten pages with ample margins and not more than 40 illustrations. For each illustration, the allowable upper limit of pages should be reduced by one.

**Accident Prevention and Treatment.**—A Joint Action Program aimed at preventing accidents and improving care of accident victims has been announced by the American College of Surgeons, the National Safety Council, and the American Association for the Surgery of Trauma. The program will include: (1) public education in accident prevention and handling of the injured, (2) employment of joint state and local committees of the American College of Surgeons and National Safety Councils, together with interested surgeons, safety engineers, and public officials to formulate safety plans for local communities, (3) possible registration of unusual cases of injury, (4) proposed investigations of emergency care of traffic injuries, (5) model legislation to require adequate training in first aid and transportation of the injured for ambulance attendants, policemen and firemen, and (6) cooperation in the production and improvement of training materials and instructional aids dealing with problems in handling the injured. Courses of instruction in first aid and transportation of the injured will be developed. Under the program, the annual inventory of traffic safety activities now conducted by the National Safety Council may be expanded to include data on the transportation of injured persons.

**Industrial Health Conference in Atlantic City.**—The 13th National Industrial Health Conference will be held April 19-23 at Convention Hall, Atlantic City, N. J. Each year the Industrial Health Conference brings together physicians and other persons in allied professions to share in the study and control of causes of disability in the working environment. Members of the Industrial Medical Association, the American Association of Industrial Dentists, the American Association of Industrial Nurses, the American Industrial Hygiene Association, and the American Conference of Governmental Industrial Hygienists will attend. Three symposiums are planned: "Medical Care of Industrial Workers," "Early Recognition of Emotional Problems by Industrial Physicians," and "Convalescence Following Illness and Injury," moderated by Drs. Asa Barnes, Louisville, Ky., Ralph T. Collins, Rochester, N. Y., and F. Curtis Dohan, Camden, N. J., respectively. A program presented by the National Council on Alcoholism will be moderated by Dr. John L. Norris, Rochester, N. Y., April 22. Dr. David B. Allman, President, American Medical Association, will present an address at the Industrial Medical Association banquet April 23. Governor Robert Meyner of New Jersey will speak. A panel discussion on certification in industrial medicine will be moderated by Dr. James H. Sterner, Rochester, N. Y. Exhibits and a program of ladies' entertainment are planned. For information write the Industrial Health Conference, Room 1313, 28 E. Jackson Blvd., Chicago 4.

**Symposium on Nutrition in New York.**—The Borden Centennial Symposium on Nutrition, presented by the Borden Company Foundation, will be held in the Waldorf-Astoria Hotel in New York, April 12. Centennial awards for "pre-eminent and pioneering research" will be presented at a banquet which will climax the symposium to Lord Boyd-Orr, former director of the Rowett Research Institute of Aberdeen, Scotland, and first director-general of the Flood and Agriculture Organization of United



Nations, and to Elmer V. McCollum, Ph.D., professor emeritus of biochemistry at the Johns Hopkins University. Each will receive a special citation, a gold medal and $2,500. Nearly 200 scientists in the field of nutrition will attend the symposium by special invitation. The theme will be "The Nutritional 'Ages of Man'—Nutrition: Past, Present and Future." Six speakers from the U. S. and abroad will present scientific papers, each dealing with man's nutritional needs at specific stages of life. There will also be a panel discussion on changes foreseen in world nutrition in the coming century. George R. Cowgill, Ph.D., professor of nutrition at Yale University, New Haven, Conn., will preside over the symposium. The Borden Company Foundation, established in 1944, carries out a program of annual recognition awards for scientists who have performed outstanding research, and for college students who have excelled in their academic work. A total of 152 Borden Awards for research, administered by scientific and professional societies, have been presented to date.

## LATIN AMERICAN

**Proctology Seminar in Mexico City.**—The 10th annual teaching seminar of the International Academy of Proctology will be held April 9-13 at the Del Prado Hotel, Mexico City, Mexico. About 22 papers are scheduled by authors from Mexico and the United States. A panel discussion, "Up-to-Date Surgical Proctology," will be moderated by Dr. Francisco Puente Pereda, professor of surgery, Medical School, University of Mexico, and will include the following subtitles and participants:

Colon Surgery, Dr. Samuel Gutierrez Vazquez, sub-director, Hospital De La Raza, Mexico.
Pediatric Surgery, Dr. Oscar Garcia Perez, pediatric surgeon, Hospital De La Raza, Mexico.
Proctological Surgery, Dr. Caesar Portes, clinical assistant professor in proctology, Chicago Medical School.
Colon Surgery, Dr. Jacob J. Weinstein, associate in surgery, George Washington University, Washington, D. C.
Anesthesia, Dr. Hector Garcia Perez, head, anesthesia department, Hospital De La Raza, Mexico.

Members of the medical profession whether affiliated with the academy or not are invited. For information write Dr. Alfred J. Cantor, International Secretary, International Academy of Proctology, 147-41 Sanford Ave., Flushing 55, New York.

## FOREIGN

**Otorhinolaryngologist Meeting in Germany.**—The 1958 meeting of the German Society of Otorhinolaryngologists will be held May 19-22 in Salzburg, Austria, as a joint meeting with the Austrian Society of Otolaryngologists. The main subject will be "The Mucosa of the Upper Air Passages as Observed in Recent Research," and Prof. Dr. W. Messerklinger, of Graz, Austria, will present the principal lecture. For information write Prof. Dr. Hans Leicher, Mainz, Univ. Hals-, Nasen-, Ohrenklinik, Germany.

**Laboratory of Protein Research in Japan.**—The Rockefeller Foundation has appropriated $50,000 to Osaka University, Nakanoshima, Japan, to help equip a new Laboratory of Protein Research which will be directed by Prof. Shiro Akabori. The laboratory will bring into one program of coordinated research the biochemists from the Medical and Dental Schools, from the Faculty of Science, and from the Institute for Microbial Diseases. The laboratory will provide training and research opportunities for young staff members and graduate students, and facilitate cooperative use of the expensive equipment which have become increasingly necessary for advanced biochemical investigation.

**"Cyto-Diagnostic" Center in Vienna.**—The Austrian Cancer Society, at a press conference in Vienna Feb. 28 announced the opening of the new "Cyto-diagnostic Centre" in Vienna. In cooperation with gynecological specialists throughout Austria, a concerted effort for the early detection of female cancer is to be carried out systematically. Annual examinations of Austrian women over 30 are to be scheduled, and secretion swabs sent to the newly established cyto-diagnostic laboratory and stained according to Papanicolaou's method. Reportedly, with the cooperation of the Austrian Cancer Society, the Austrian Pathological Society, and the Austrian Society for Gynecology and Obstetrics, country-wide examinations can be given annually.

# EXAMINATIONS AND LICENSURE

## EDUCATIONAL COUNCIL FOR FOREIGN MEDICAL GRADUATES, INC.

Educational Council for Foreign Medical Graduates, Inc.: The American medical qualification examination to be given henceforth twice a year for foreign medical graduates. Medical Schools in the United States and Foreign Countries, Sept. 23. Final date for filing application is June 23. Executive Director, Dr. Dean F. Smiley, 1710 Orrington Ave., Evanston, Illinois.

## BOARDS OF MEDICAL EXAMINERS

ALABAMA: *Examination.* Montgomery, June 17-19. Sec., Dr. D. G. Gill, State Office Building, Montgomery 4.

ARIZONA:* *Examination and Reciprocity.* Phoenix, April 16-18. Exec. Sec., Mr. Robert Carpenter, 826 Security Bldg., Phoenix.

ARKANSAS:* *Examination.* Little Rock, June 5-6. Sec., Dr. Joe Verser, Harrisburg.

CALIFORNIA: *Written. Examination.* San Francisco, June 16-19; Los Angeles, August 18-21; Sacramento, Oct. 20-23. *Oral Examination.* San Francisco, June 14; Los Angeles,

August 16; San Francisco, November 15. *Oral and Clinical Examination for Foreign Medical School Graduates.* San Francisco, June 15; Los Angeles, August 17; San Francisco, November 16. Sec., Dr. Louis E. Jones, 1020 N Street, Sacramento.

COLORADO:* *Examination and Reciprocity.* Denver, June 10-11. Exec. Sec., Mrs. Beulah H. Hudgens, 715 Republic Bldg., Denver 2.

DELAWARE: *Examination and Reciprocity.* Dover, July 8-10. Sec., Dr. Joseph S. McDaniel, Professional Bldg., Dover.

FLORIDA:* *Examination.* Miami, June 29-July 1. Sec., Dr. Homer L. Pearson, 901 N.W. 17th St., Miami.

GEORGIA: *Examination and Reciprocity.* Atlanta and Augusta, June. Sec., Mr. C. L. Clifton, 224 State Capitol, Atlanta.

IDAHO: *Examination.* Boise, July 14-16. Exec. Sec., Mr. Armand L. Bird, 364 Sonna Bldg., Boise.

ILLINOIS: *Examination and Reciprocity.* Chicago, April 7-10. Superintendent of Registration, Mr. Fredric B. Selcke, Capitol Bldg., Springfield.

INDIANA: *Examination.* Indianapolis, June 18-20. Exec. Sec., Miss Ruth V. Kirk, 538 K. of P. Bldg., Indianapolis.

IOWA:* *Examination.* Iowa City, June 16-18. Exec. Sec., Mr. Ronald V. Saf, State Office Bldg., Des Moines 19.

KANSAS:* *Examination.* Kansas City, June 13-14. Sec., Dr. F. J. Nash, New Brotherhood Bldg., Kansas City.

LOUISIANA: *Examination and Reciprocity.* New Orleans, June 5-7. Sec., Dr. Edwin H. Lawson, 930 Hibernia Bank Bldg., New Orleans.

MARYLAND: *Examination.* Baltimore, June 17-20. Sec., Dr. Frank K. Morris, 1211 Cathedral St., Baltimore 1.

MASSACHUSETTS: *Examination.* Boston, July 15-18. Sec., Dr. Robert C. Cochrane, Room 37 State House, Boston.

MICHIGAN:* *Examination.* Ann Arbor and Detroit, June 9-11. Sec., Dr. E. C. Swanson, 118 Stevens T. Mason Bldg., West Michigan Ave., Lansing 8.

MINNESOTA:* *Examination.* Minneapolis, April 15-17. Sec., Dr. F. H. Magney, 230 Lowry Medical Arts Bldg., St. Paul 2.

MISSOURI: *Examination.* St. Louis, May 30-31. Ex. Sec., Mr. John A. Hailey, Jefferson City.

MONTANA: *Examination and Reciprocity.* Helena, April 1, Sec., Dr. Thomas L. Hawkins, 555 Fuller Ave., Helena.

NEBRASKA:* *Examination.* Omaha, June. Sec., Mr. Husted K. Watson, Room 1009, State Capitol Bldg., Lincoln 9.

NEW MEXICO:* *Examination and Reciprocity.* Santa Fe, May 19-20. Sec., Dr. R. C. Derbyshire, 227 E. Palace Ave., Santa Fe.

NEW YORK: *Examination.* Albany, Buffalo, New York City and Syracuse, June 24-26. Sec., Dr. Stiles D. Ezell, 23 S. Pearl St., Albany.

NORTH CAROLINA: *Endorsement.* Asheville, May 5. *Examination.* Raleigh, June 16-19. *Endorsement.* Raleigh, June 17. Asst. Sec., Mrs. Louise J. McNeill, Professional Bldg., Raleigh.

NORTH DAKOTA: *Examination.* Grand Forks, July 9-11. *Reciprocity.* Grand Forks, July 12. Sec., Dr. C. J. Glaspel, Grafton.

OHIO: *Endorsement.* Columbus, April 1; *Examination.* June 19-21. Sec., Dr. H. M. Platter, 21 West Broad St., Columbus 15.

OKLAHOMA:* *Examination.* Oklahoma City, June 3-4. Sec., Dr. E. F. Lester, 813 Braniff Bldg., Oklahoma City.

OREGON:* *Examination.* Portland, April 11-12. Exec. Sec., Mr. Howard I. Bobbitt, 609 Failing Bldg., Portland.

PENNSYLVANIA: *Examination.* Philadelphia and Pittsburgh, July 8-10. Acting Sec., Mrs. Marguerite G. Steiner, Box 911, Harrisburg.

RHODE ISLAND:* *Endorsement.* Providence, March 20. *Examination.* Providence, April 3-4. Administrator of Professional Regulation, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

SOUTH DAKOTA:* *Examination.* Rapid City, August 12-13. Exec. Sec., Mr. John C. Foster, 300 First National Bank Bldg., Sioux Falls.

TEXAS:* *Examination and Reciprocity.* Fort Worth, June 23-25. Sec., Dr. M. H. Crabb, 1714 Medical Arts Bldg., Fort Worth 2.

UTAH: *Examination.* Salt Lake City, July 9-11. Director, Mr. Frank E. Lees, 324 State Capitol Bldg., Salt Lake City 1.

VIRGINIA: *Examination.* Richmond, June 12-14. *Reciprocity.* Richmond, June 11. Address: Board of Medical Examiners, 631 First St., S.W., Roanoke.

WASHINGTON:* *Examination.* Seattle, July 14-16. Administrator, Mr. Thomas A. Carter, Capitol Bldg., Olympia.

WEST VIRGINIA: *Examination and Reciprocity.* Charleston, April 14 and July (date not set). Sec., Dr. N. H. Dyer, State Office Bldg., No. 5, Charleston.

WISCONSIN:* *Endorsement.* Madison, April 25. *Examination.* Milwaukee, July 8-10. Sec., Dr. Thomas W. Torrney, Jr., 1140 State Office Bldg., 1 West Wilson St., Madison.

WYOMING: *Examination and Reciprocity.* Cheyenne, June 2. Sec., Dr. Franklin D. Yoder, State Office Bldg., Cheyenne.

ALASKA:* On application in Anchorage and Juneau. Sec., Dr. W. M. Whitehead, 172 South Franklin St., Juneau.

GUAM: *Subject to Call.* Act. Sec., Dr. S. F. Provencher, Agana.

HAWAII: *Examination.* Honolulu, July 14-15. Sec., Dr. I. L. Tilden, 1029 Kapiolani St., Honolulu.

## BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ALASKA: *Examination.* Juneau, Nov. 4. Sec., Dr. R. Harrison Leer, Room 204, Alaska Office Bldg., Juneau.

ARIZONA: *Examination.* Tucson, March 18. Sec., Mr. Herman C. Bateman, University of Arizona, Tucson.

ARKANSAS: *Examination.* Little Rock, May 5-6. Sec., Mr. S. C. Dellinger, Zoology Department, University of Arkansas, Fayetteville.

COLORADO: *Examination and Endorsement.* Denver, May 7-8. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver 18.

CONNECTICUT: *Examination and Endorsement.* New Haven, June 14. Exec. Asst., Mrs. Regina G. Brown, 258 Bradley St., New Haven 10.

DISTRICT OF COLUMBIA: *Examination.* Washington, April 14-15. Deputy Director, Commission on Licensure, Mr. Paul Foley, 1740 Massachusetts Ave., N. W., Washington 6.

FLORIDA: *Examination.* Miami, June 7. Sec., Mr. M. W. Emmel, Box 340, Gainesville.

IOWA: *Examination.* Des Moines, April 8. Sec., Dr. Elmer W. Hertel, Wartburg College, Waverly.

KANSAS: *Examination.* Kansas City, June 3-4. Sec., Dr. R. E. Stowell, University of Kansas School of Medicine, Kansas City 12.

MINNESOTA: *Examination.* Minneapolis, April 1-2. Sec., Dr. Raymond N. Bieter, 105 Millard Hall, University of Minnesota, Minneapolis 14.

NEW MEXICO: *Examination.* Santa Fe, April 20. *Reciprocity.* Santa Fe, March 26. Sec., Mrs. Marguerite Cantrell, Box 1522, Santa Fe.

OKLAHOMA: *Examination.* Oklahoma City, April 4-5. Sec., Dr. E. F. Lester, 813 Braniff Bldg., Oklahoma City.

SOUTH DAKOTA: *Examination.* Vermillion, June 6-7. Sec., Dr. Gregg M. Evans, 310 E. 15th St., Yankton.

RHODE ISLAND: *Endorsement.* Providence, April 30. *Examination.* Providence, May 14. Administrator of Professional Regulation, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

TEXAS: *Examination.* April 18-19, Austin, Galveston and Houston. Sec., Bro. Raphael Wilson, 407 Perry Brooks Bldg., Austin.

WISCONSIN: *Examination.* Milwaukee, June 7. Sec., Mr. William H. Barber, 621 Ransom St., Ripon.

*Basic Science Certificate required.

# DEATHS

**Alexander, Elmo,** Visalia, Calif.; University of Texas School of Medicine, Galveston, 1923; an associate member of the American Medical Association; veteran of World War I; county health officer; died in the Veterans Administration Hospital in Fresno Jan. 20, aged 64, of heart disease.

**Allen, Ellis Saunders Sr.** ✱ Louisville, Ky.; University of Louisville Medical Department, 1901; fellow of the American College of Surgeons; past-president of the Jefferson County Medical Society; served on the faculty of his alma mater; associated with the Children's Hospital and Kentucky Baptist Hospital, where he died Jan. 11, aged 81.

**Allen, Homer Bryan** ✱ Brownwood, Texas; University of Texas School of Medicine, Galveston, 1919; fellow of the International College of Surgeons and the American College of Surgeons; past-president and secretary of the Brown–Comanche, Mills–San Saba Counties Medical Society; served on the public school board; served on the board of trustees of the Howard Payne College; associated with the Medical Arts Hospital, where he died Jan. 21, aged 67, of congestive heart failure and diabetes mellitus.

**Bardill, Albert Lawrence,** Nashville, Tenn.; University of Tennessee Medical Department, Nashville, 1908; died in the Nashville General Hospital Jan. 16, aged 72, of carcinoma of the liver.

**Barker, Joseph Walter** ✱ Hebron, Ohio; Baltimore Medical College, 1898; formerly practiced in Newark, where he was on the staff of Newark Hospital; died in the University Hospital, Columbus, Jan. 19, aged 84.

**Barrett, Channing Whitney** ✱ Montpelier, Ohio; Detroit College of Medicine, 1895; member of the American Association of Obstetricians and Gynecologists; veteran of World War I; formerly practiced in Chicago, where he was on the faculty of the University of Illinois College of Medicine and Loyola University School of Medicine; past-president of the North Side Branch of the Chicago Medical Society; past-president of the Chicago Gynecological Society; served on the staff of the Cook County Hospital in Chicago; died in the Veterans Administration Hospital, Fayetteville, Ark., Jan. 29, aged 91.

**Betts, Lester,** Schenectady, N. Y.; Albany (N. Y.) Medical College, 1899; an associate member of the American Medical Association; fellow of the American College of Physicians; associated with the Ellis Hospital, where he died Jan. 12, aged 83, of acute myocardial infarction.

**Bell, John Dupre,** Pensacola, Fla.; Tulane University School of Medicine, New Orleans, 1926; veteran of World Wars I and II and the Korean Conflict; associated with Sacred Heart, Baptist, Pensacola Maternity, Our Lady of Angels, and Escambia General hospitals; died Jan. 28, aged 58.

**Bendick, John Joseph,** Olyphant, Pa.; Bennett Medical College, Chicago, 1913; an associate member of the American Medical Association; served as president of the Lackawanna County Medical Society; formerly county coroner and county treasurer; at one time medical director of Lackawanna County; served as medical director of the Lackawanna County Jail and the Olyphant Schools; veteran of World War I; died in the Veterans Administration Hospital in Wilkes–Barre Jan. 27, aged 67.

**Bippus, Edward Samuel,** Lake Worth, Fla.; Maryland Medical College, Baltimore, 1906; an associate member of the American Medical Association; member of the West Virginia State Medical Association; formerly practiced in Wheeling, W. Va., and served as president of the Ohio County Medical Society; died Jan. 12, aged 71, of heart disease.

**Breeding, Earle Griffith** ✱ Washington, D. C.; University of Maryland School of Medicine, Baltimore, 1913; specialist certified by the American Board of Otolaryngology; fellow of the American College of Surgeons; served as president of the Washington Medical and Surgical Society; formerly on the faculty of Georgetown University School of Medicine; veteran of World War I; for many years associated with the Episcopal Eye, Ear and Throat Hospital; died in the Doctors Hospital Jan. 16, aged 69.

**Beneke, John P.,** Cincinnati; Medical College of Ohio, Cincinnati, 1901; associated with the Deaconess Hospital; died Jan. 14, aged 80, of cerebral thrombosis and hypertension.

**Benoit, Samuel Joseph** ✱ Leominster, Mass.; Baltimore University School of Medicine, 1904; veteran of World War I; died in the Veterans Administration Center, Bay Pines, Fla., Jan. 22, aged 77, of pulmonary emphysema.

**Connor, Clarence Herbert,** Colonel, U. S. Army, retired, Pelham Manor, N. Y.; University of Virginia Department of Medicine, Charlottesville, 1901; service member of the American Medical

✱ Indicates Member of the American Medical Association.

Association; fellow of the American College of Surgeons; entered the regular Army in 1902; served in the Philippines, on the Mexican border, and in World War I; retired from the Army in 1922; later health officer of Pelham Manor; died Jan. 26, aged 80.

**Cooper, Alfred John,** San Diego, Calif.; College of Medical Evangelists, Loma Linda and Los Angeles, 1925; an associate member of the American Medical Association; member of the Radiological Society of North America; veteran of World War II; held the Asiatic Pacific Theater ribbon with two bronze stars, American defense ribbon, Victory Ribbon, and Unit Citation award; died Jan. 12, aged 58.

**Fabian, Abraham Appelsis** • New York City; Creighton University School of Medicine, Omaha, 1934; clinical professor of psychiatry at the State University of New York College of Medicine in Brooklyn; specialist certified by the American Board of Psychiatry and Neurology; member of the American Psychoanalytic Association, American Psychosomatic Society, and the American Psychiatric Association; served as clinical director of the Brooklyn Juvenile Guidance Center; consultant, Brooklyn State Hospital; died Jan. 19, aged 48, of acute coronary thrombosis.

**Fraser, Hugh Daniel,** Ridley Park, Pa.; Jefferson Medical College of Philadelphia, 1897; an associate member of the American Medical Association; formerly practiced in Philadelphia, where he was on the faculty of his alma mater and the Jefferson Hospital; died in Upland Jan. 10, aged 88.

**Gerzog, Bennett George,** Brooklyn; Long Island College Hospital, Brooklyn, 1907; member of the Medical Society of the State of New York; specialist certified by the American Board of Otolaryngology; associated with Beth-El Hospital; consulting otologist, Maimonides Hospital and Jewish Sanitarium and Hospital for Chronic Diseases; died Jan 12, aged 71, of acute coronary thrombosis and hypertension.

**Kerr, Thomas S. S.,** Chicago; College of Medicine and Surgery, Chicago, 1900; died Jan. 11, aged 90, of acute myocardial failure and chronic infectious cystitis.

**Lamont, John G.,** Oklahoma City, Okla.; Trinity Medical College, Toronto, Ontario, Canada, 1895; member and at one time secretary of the North Dakota State Medical Association; for many years medical superintendent of the North Dakota State Tuberculosis Sanatorium in San Haven, and the Grafton (N. D.) State School; died Jan. 7, aged 87, of congestive heart failure and arteriosclerosis.

**Moses, Henry Monroe,** Brooklyn; Long Island College Hospital, Brooklyn, 1904; an associate member of the American Medical Association; specialist certified by the American Board of Internal Medicine; fellow of the American College of Physicians; served on the faculty of his alma mater; veteran of World War I; associated with Brooklyn State Hospital, Huntington (N. Y.) Hospital, Kings County Hospital, Wyckoff Heights Hospital, Unity Hospital, Brooklyn Cancer Institute, and the Carson C. Peck Memorial Hospital, where he died Jan. 11, aged 82.

**Nelson, Fritz** • Colorado Springs, Colo.; Albert-Ludwigs-Universität Medizinische Fakultät, Freiburg, Baden, Germany, 1914; specialist certified by the American Board of Ophthalmology; member of the American Academy of Ophthalmology and Otolaryngology; lecturer in ophthalmology at the University of Colorado School of Medicine, Denver; served during World War I; associated with Glockner-Penrose, Memorial, and St. Francis hospitals; died Jan. 2, aged 67, of aneurysm of the aorta.

**O'Donoghue, James Horatio** • Atlantic, Iowa; Illinois Medical College, Chicago, 1904; past-president of the Twin Lakes District Medical Society; veteran of World War I; for many years served on the board of trustees of Morningside College in Sioux City, where he was at one time head of the department of chemistry; on the staff of the Buena Vista County Hospital; died in Council Bluffs, Jan. 7, aged 90, of uremia.

**Peterson, Donald Rosswell** • Independence, Wis.; Marquette University School of Medicine, Milwaukee, 1930; on the staff of St. Joseph's Hospital in Arcadia; died in the Whitehall (Wis.) Community Hospital Dec. 30, aged 56, of a coronary disease due to arteriosclerosis and diabetes mellitus.

**Phillipy, Frank Emory II,** Nashville, Tenn.; Vanderbilt University School of Medicine, Nashville, 1957; interned in pathology at Vanderbilt University Hospital; died Nov. 19, aged 25, of cancer.

**Rogers, William Jehiel,** Cleveland; Western Reserve University School of Medicine, Cleveland, 1914; member of the Ohio State Medical Association and the American Academy of General Practice; associated with the Grace Hospital, where he died Dec. 22, aged 69, of coronary occlusion.

**Schück, Franz,** New York City; born in Breslau, Germany, Oct. 24, 1888; Schlesische-Friedrich-Wilhelms-Universität Medizinische Fakultät, Breslau, Prussia, Germany, 1911; service member of the American Medical Association; in 1934 received a two-year appointment as a research fellow of the Rockefeller Foundation and became a lecturer at New York University College of Medicine; later placed in charge of neurosurgery at Queens General Hospital; during World War I won the German Iron Cross, 1st and 2nd class, and the Turkish

Medal with Crossed Swords; during World War II was called to Washington, D. C., to become medical consultant to the physical-fitness program of the United States Public Health Service; senior neurologist, New York Regional Office, Veterans Administration; died Jan. 19, aged 69, of uremia and cancer.

**Sigler, Richard Roberts,** Bozeman, Mont.; University of Louisville (Ky.) School of Medicine, 1924; veteran of World War I; an associate member of the American Medical Association; fellow of the American College of Surgeons; died in Mesa, Ariz., Jan 2, aged 62.

**Stefanski, Helen Fadora,** Chicago; Loyola University School of Medicine, Chicago, 1916; died Jan. 2, aged 68, of acute coronary thrombosis, hypertension, and arteriosclerosis.

**Stone, Edna Miller** ✦ St. Louis; Barnes Medical College, St. Louis, 1909; associated with Evangelical Deaconess Hospital and St. Anthony Hospital; died in the St. Louis Chronic Hospital Jan. 9, aged 79, of myocardial infarction, arteriosclerotic heart disease, and diabetes mellitus.

**Tanguay, Joseph Edgar** ✦ Woonsocket, R. I.; University of Bishop College Faculty of Medicine, Montreal, Que., Canada, 1899; past-president and secretary of the Woonsocket District Medical Society; for many years an examining physician for the school department; associated with the Woonsocket Hospital; died Jan. 5, aged 81, of coronary thrombosis, lymphatic leukemia, and diabetes mellitus.

**Walker, Howard Monroe** ✦ Spartanburg, S. C.; University of Texas School of Medicine, Galveston, 1921; specialist certified by the American Board of Radiology; member of the Radiological Society of North America and the American College of Radiology; died in the Duke University Hospital, Durham, N. C., Nov. 26, aged 59, of pulmonary edema.

**Wayman, Cecil Lafayette,** Murfreesboro, Tenn.; Central College of Physicians and Surgeons, Indianapolis, 1903; served on the staff of the Veterans Administration Hospital; died Jan. 4, aged 80, of cardiovascular disease.

**Weisberg, William Wiener** ✦ Oak Park, Mich.; University of Michigan Medical School, Ann Arbor, 1941; member of the American Academy of General Practice and the Industrial Medical Association; veteran of World War II; died in the Sinai Hospital, Detroit, Nov. 23, aged 41, of digitoxin intoxication.

**West, Paul Leroy,** Wenatchee, Wash.; Colorado School of Medicine, Boulder, 1902; fellow of the American Public Health Association; veteran of World War I; served as district health officer of Chelan–Douglas County; on the staff of St. Anthony's Hospital, where he died Dec. 2, aged 84, of a cerebral accident.

**West, Walter Raymond** ✦ Idaho Falls, Idaho; University of Cincinnati College of Medicine, 1925; fellow of the International College of Surgeons; member of the American Academy of General Practice; served on the staff of Sacred Heart Hospital and as president of the staff of Idaho Falls Latter Day Saints' Hospital, where he died Jan. 2, aged 62, of cancer.

**Willcutt, Clarence Elvin** ✦ Phoenix, Ariz.; State University of Iowa College of Medicine, Iowa City, 1909; died in St. Joseph's Hospital Jan. 8, aged 74, of dissecting aneurysm, arteriosclerosis, arthritis, and myocardial infarction.

**Willis, Carson Allen,** Denver; University of Maryland School of Medicine, Baltimore, 1904; an associate member of the American Medical Association; member of the West Virginia State Medical Association; formerly practiced in Huntington, W. Va., where he was associated with the Veterans Administration Hospital; died Jan. 12, aged 79, of chronic myocarditis and arteriosclerosis.

**Winslow, Floyd Stone** ✦ Rochester, N. Y.; born in Henrietta, N. Y., May 17, 1880; Cornell University Medical College, New York City, 1906; for nearly 25 years a member of the House of Delegates of the American Medical Association; past-president, and for 23 years chairman of the public relations committee of the Medical Society of the State of New York; past-president of the Medical Society of the County of Monroe; the Newspaper Reporters' Association of New York honored him with its Byline Service Award, primarily for his efforts in developing a guide of cooperation between the medical profession and the various public information media, a resolution adopted by his county society when members honored him said that for "20 years he has nurtured, cajoled, inspired, and molded physician thinking about the value of public relations;" veteran of World War I; fellow of the American College of Surgeons; served as president of the Rochester Pathological Society and the International Cornell Alumni Corporation; health officer of Henrietta; for many years coroner's physician of Monroe County; in 1949 the Award of Merit for distinguished service was presented to him by the Rochester Academy of Medicine; associate in pathology, University of Rochester School of Medicine and Dentistry; consultant at the Rochester General Hospital and associate pathologist, Strong Memorial Hospital; president of the board of managers of Iola Sanitarium; died in his sleep Feb. 18, aged 77.

# FOREIGN LETTERS

## AUSTRIA

**Surgical Treatment of Pulmonary Diseases in Children.**—Dr. H. H. Hartl at the November meeting of the Society of Pediatrics of Vienna said the current opinion that the treatment of pleuropulmonary abscesses and pleural empyema in infants and young children has become a medical rather than surgical problem as the result of antibiotics can no longer be held because of the emergence of antibiotic-resistant organisms, especially hemolytic staphylococci. In a recent series of patients treated by Hartl, all staphylococci were resistant to penicillin. Resistance to tetracycline is also increasing, and as a result surgical treatment is necessary in an increasing proportion of patients. Results can be improved by more frequent and earlier employment of suction drainage which provides continuous drainage of pus, prevents its inspissation, and reduces the coagulation of fibrin. The lung reexpands, and during intrapleural therapy the concentration of antibiotics becomes maximal by virtue of the smaller surface. Furthermore, antibiotics can be instilled intrapleurally without painful puncture. Through cooperation between pediatrician and surgeon in the matter of determining the optimal time for treatment in each individual patient, the percentage of resections required was reduced from 45.4 to 20.8%.

Of 47 operations on a series of 35 children ranging in age up to two years, 35 consisted of suction drainage. Five patients died, and in nine others healing could not be obtained. In one of the two on whom pneumonectomy was performed, it was impossible to collapse the abscess, and lobectomy was necessary. If in patients with chronic empyema the pus has been removed by suction drainage, if there is no bronchial fistula, and if the lung fails to become inflated or collapses again, then under barbiturate anesthesia and with a synthetic muscle relaxant the bronchial tree is drained by suction through a bronchoscope, and intubation and open aspiration drainage are performed and the collapsed lung is inflated, using a slight positive pressure so that the air of the pleural cavity escapes through the drainage tube. The success of this procedure can be evaluated at once by auscultation or fluoroscopy. In this way it is possible to obtain a complete inflation of the lung, and this probably saved a number of children from the necessity of decortication. When the suction drainage fails in the presence of bronchial fistula or a perforated bronchiectatic cavity, decortication and pulmonary resection become necessary. Suction drainage was generally carried out for acute empyema. Those who required pulmonary resection were generally in poor condition as the result of prolonged chronic suppuration. Only close collaboration between pediatrician and surgeon can improve the results of the treatment of pleuropulmonary suppurations in children under two years old.

The items in these letters are contributed by regular correspondents in the various foreign countries.

## BRAZIL

**Oral Lesions of Paracoccidioidomycosis.**—At a meeting of the Associação Paulista de Medicina, Dr. José B. Fonseca reported a series of 25 patients with paracoccidioidomycosis on whom odontostomatological examinations including roentgenographic, mycological, and histopathological studies were made. He concluded that the widespread habit of rubbing the gums to relieve itching aids in the dissemination of the parasite through the lymphatic channels to the deep layers without the presence of superficial lesions of the gums. This would explain the presence of the fungus in peridental tissues without concomitant gingival ulcers in 11 of the patients. Once established in the peridental tissues, the parasite may cause intense osteolysis, cementolysis, and fibrolysis, which explains the rapid loosening of the teeth. In the body of the maxillas the speaker found a process of osteosclerosis with concomitant destruction of the alveolar apophyses. The fungus showed preference for the peridental structures, perhaps because of their abundant lymphoid tissue. In such locations it was especially resistant to sulfonamides. On the other hand in 7 pulps and in 15 granulomas resulting from pulpal lesions, as well as in patients with peridental or gingival localization of the fungus, such resistance was not found. The direct search for Blastomyces brasiliensis in the exudate from gingival pouches was positive in two patients with common periodontitis. Dentists should be sure to get a laboratory report on specimens taken from their patients and the cooperation of a physician whenever this disease is suspected.

**The Coombs Test.**—A study of 22 patients by Dr. G. M. Leite and co-workers (*Revista paulista de medicine*, vol. 51, 1957) indicates that the Coombs test alone is not always diagnostic. All the patients

in this series had anemia in some form. The Coombs test was positive in four of seven patients with acquired idiopathic hemolytic anemia, in two with hemolytic anemia associated with hepatic cirrhosis, in one with megaloblastic achylic anemia presenting evidence of hemolysis, in one with macroglobulinemia with hemolytic anemia, and in one with aplastic anemia unaccompanied by hemolysis. The direct and indirect tests were negative in three of seven patients with idiopathic acquired hemolytic anemia, in two with nocturnal paroxysmal hemoglobinuria, in three with constitutional spherocytic anemia, and in one with each of the following diseases: hypoplastic anemia, acute lymphatic leukemia, sickle-cell anemia, lymphosarcoma, and hypochromic anemia.

In one patient the red blood cells, after having been washed several times in saline solution, became negative to the Coombs test. In another the test became positive only after the erythrocytes were washed six times in saline solution. Presumably, in this case there was an excess of antibody, even after the third washing, with the occurrence of a zone phenomenon. The authors concluded that (1) the direct Coombs test is not positive in all patients with acquired hemolytic anemia, other serologic tests being more useful; (2) a positive direct Coombs test cannot be the basis for a definite diagnosis of hemolytic disease in the active phase and does not mean that a free antibody exists in the serum; (3) the antibody or substance responsible for the erythrocyte sensitization is, in some cases, removable by successive washings in saline solution, being able to produce a zone phenomenon; and (4) the Coombs test is negative in the congenital hemolytic form of anemia.

**Occult Bone Metastases.**—Dr. Vinicius Faria and co-workers (*Boletim do hospital dos servidores*, vol. 9, 1957) reported on four women 42, 43, 49, and 52 years of age, respectively, who had had a mastectomy because of cancer and who long after the operations complained of bone pains even though roentgenograms did not reveal any metastases. Zones of osteolysis were found later at these painful sites. In such patients a tentative diagnosis of bony metastasis should be made even in the absence of x-ray evidence.

## FRANCE

**Poliomyelitis Vaccine.**—A new laboratory for the manufacture of the Lepine poliomyelitis vaccine was opened near Paris. Production will be 500,000 ampules a week, and it is hoped to increase this shortly to 1,500,000 weekly. The process, based on work done by Professor Lepine of the Pasteur Institute, involves the use of monkey kidney. When in full production the laboratory will use 100 monkeys a week for the preparation of the vaccine. About a million French children have received the Lepine vaccine, and subsequently tests for immunity have been made on about 20% of them. The tests show that the vaccine affords good protection. The number of cases of poliomyelitis in France increased last year, when 4,000 cases were reported, compared with 1,200 in the previous year.

## INDIA

**Prolonged Anticoagulant Treatment.**—Shah and Phear (*Journal of the Association of Physicians of India*, vol. 6, January, 1958) treated 44 outpatients with anticoagulants (phenindione, bishydroxycoumarin, and ethyl biscoumacetate) for 3 to 80 months. Since 1953, the first of these drugs was used in almost all the patients, the dose varying from 25 to 150 mg. daily, according to the patient's response. After an initial period in the hospital when daily prothrombin estimations were made and the dose established, the patients were asked to attend a special outpatient clinic for further estimations at intervals from one to eight weeks. The aim was to maintain the prothrombin level at 15 to 35% of normal. Levels of less than 10% were considered dangerous and levels higher than 50% indicated that the treatment was ineffective. The patients were asked to go to the hospital immediately in the event of bleeding or untoward symptoms. They were also supplied with 10-mg. capsules of vitamin K. The patients included in the study suffered from coronary heart disease, rheumatic heart disease with multiple emboli, and recurrent peripheral thrombosis.

The results on the whole were satisfactory. One patient with recurrent peripheral thrombosis died of internal hemorrhage during the course of treatment, and the autopsy showed acute hemorrhagic pancreatitis and extensive subarachnoid hemorrhage. There were 13 patients with two or more attacks of myocardial infarction. Two patients died of a further infarction and one died of congestive failure. The remaining 10 had no further infarctions. In six patients with severe angina, no infarction occurred, and all showed an increase in effort tolerance. Of eight patients with rheumatic heart disease, one took anticoagulants for only four months and was not included in the results. In this group only one possible embolism occurred during treatment. There was a striking decrease in the frequency of emboli. The remaining 17 had recurrent peripheral thromboses. In two, venous thrombosis recurred. One died of congestive cardiac failure and there was one death due to internal bleeding, as already mentioned. Of the 44 patients, minor hemorrhagic episodes such as hematuria and epistaxis occurred in only 8 patients during treatment.

**Progress in Research.**—Inaugurating the annual meeting of the Indian Council of Medical Research in Lucknow, the Union Health Minister said that malaria was now a vanishing disease due to the easy availability of synthetic antimalarial drugs. Early in 1957, reports were received by the Virus Research Center in Poona, of excessive mortality among monkeys in the forests of Mysore State. Teams sent out by the Center found that villagers in that area were also dying of some kind of fever. Within one month the Center was able to show that the epidemic was caused by a virus belonging to the Russian spring and summer encephalitis group and transmitted through ticks. Field rodents in the forest area were the most likely reservoirs of infection.

**Susceptibility of Mosquitoes to DDT.**—Rao and Bhatia (*Indian Journal of Malariology*, vol. 11, September, 1957) stated that measurements by the World Health Organization technique of the susceptibility to DDT of caught female specimens of Anopheles culicifacies were made in widely scattered localities in the Bombay State. The areas surveyed included those unsprayed and those where spraying had been in progress for one to eight years. The type of DDT used was either the para-para or the technical. Due allowances for the higher mortalities obtained with the para-para type were made in interpreting the results and comparing with those obtained by others. The median lethal concentrations (MLC) for A. culicifacies ranged between 0.24 and 0.54% with the para-para type and between 0.5 and 0.6% with the technical. In the unsprayed areas the MLC were between 0.24 and 0.38% with the para-para type and in sprayed areas they were between 0.41 and 0.54%. No significant lowering of susceptibility was discovered even in areas where DDT had been sprayed for eight years. A vigil must be maintained because of the theoretical possibility of the sudden appearance of DDT-resistant mutants.

## UNITED KINGDOM

**Exercise and Slimming.**—Passmore (*Lancet* 1:29, 1958) believes that exercise is a useful adjunct in the treatment of obesity in sedentary workers. His evidence is an experiment carried out on an obese dog, in which periods of confinement to its kennel were alternated with a period of light exercise and one of hard exercise. The average daily food consumption was 378 Gm. (0.8 lb.) during the first sedentary period, 331 Gm. (0.7 lb.) during the period of light exercise, 396 Gm. (0.9 lb.) during the second sedentary period, and 391 Gm. during the period of hard exercise. Over the whole period the weight fell from 25 to 22.6 kg. (55.2 to 49.8 lb.). In this animal, a short period of exercise did not increase the appetite above that of the sedentary level, as has been suggested is the case in human beings. The result supports the belief that a certain minimal level of physical activity is necessary for the appetite to function with precision and to adjust food intake to requirements. If this hypothesis can be substantiated in man, it has great practical importance in the treatment of obesity. The sedentary character of the life led by most urban people is not generally recognized, according to Passmore. Even military cadets and coal miners, members of two of the most physically active occupations, spend about 75% of their working day lying, sitting, or standing. The daily physical activity of many thousands of light workers and housewives may be below the threshold needed for appetite to function normally. They may overeat and become obese. If this is so the first duty of their physician is to prescribe a suitable regimen of physical activities.

**Smoking Deterrents.**—To assess the usefulness of lobeline as a smoking deterrent, Miley and White (*Brit. M. J.* 1:101, 1958) compared the efficacy of tablets containing (1) 1 mg. of lobeline hydrochloride, 15 mg. of sodium bicarbonate, 125 mg. of dried aluminium hydroxide gel, and 0.32 mg. of copper sulfate, (2) the same without the lobeline, and (3) the same as (2) without the copper sulfate. Patients were told to take two tables every four hours, up to a daily maximum of eight. The tablets were to be retained in the mouth for a few seconds, to allow the copper sulfate to have some effect. The 60 volunteers who took part in the trial were seen 7 and 14 days after the start of the trial; 25% were successful in cutting out or drastically reducing their daily cigarette consumption, regardless of the type of tablet used. Slightly over 50% were smoking less towards the end of the second week than when they first started, irrespective of the type of tablet used, and less than 25% failed to respond at all.

**Identification from Immature Bones.**—The first report of medicolegal identification which, in the absence of all soft parts, had to be based on the estimation of age, sex, and height from portions of immature human bones, was made by Imrie and Wyburn (*Brit. M. J.* 1:128, 1958). In March, 1956, a skull, mandible, some loose teeth, and 128 separate pieces of bone, many partially destroyed, were found scattered over an area of a few hundred square yards of hillside in the west of Scotland. From this unpromising material, the authors concluded that the bones were part of the skeleton of a boy, age of from 12½ to 13½ years, with an estimated height of 147 cm. (4 ft. 10 in.). Eleven months before the discovery of the bones, an orphan, aged 13 years 11 months, had been reported missing from an institution in the same county,

and had not been found. The last height measurement of him was 138 cm. (4 ft. 6 in.), in April, 1954. As he had grown 3.2 cm. 1.2 in.) in the preceding four months, it was considered reasonable to assume that he would have been 5 to 7.5 cm. (2 to 3 in.) taller when he disappeared in April, 1955. The dental record of the missing boy corresponded to the dental condition as indicated by the eruption pattern and the dental casts of the fragments found. This strong presumptive evidence satisfied the authorities that the recovered bones were those of the missing boy.

**Clean Air.**—According to an article in *Lancet* (Jan. 4, 1958) the National Smoke Abatement Society on Jan. 1 changed its name to the National Society for Clean Air, in recognition of its widening scope. The Beaver committee estimated that the most heavily polluted areas could be made smokeless in 10 to 15 years if smoke-control areas could be extended by 300,000 acres yearly; but the total for 1957 was only 489, and that projected for 1958 less than 10,000 acres. Continued and increasing publicity and public education on this subject are badly needed.

**Burns.**—W. E. M. Wardill (*Brit. M. J.*, Jan. 4, 1958) stated that paraffin stoves are commonly used in Iraq for cooking, and accidents with these often cause extensive burns, especially of women and children. The patients are treated in surgical wards of the Royal Hospital, Baghdad, and the basis of the method is to expose the burned surfaces to the air. As soon as the patient is fit, he is placed in a warm bath containing cetrimide, and this bath is repeated every two or three days. Early ambulation is an important part of the treatment. At the first bathing loose epidermis and blisters are removed. The resulting granulating surfaces of deep burns are again exposed and bathed at intervals, and the granulations remain flat and smooth with little infection, so that exudation is minimal. With no septic absorption from the burn, fever is unusual. Antibiotics are not used routinely since they do not alter the course of healing. In a series of over 400 burned patients treated by this method skin grafting was rarely required. The most significant feature was the freedom from infection. This was probably related more to environmental conditions than to technique. During most of the year the ward temperature is between 80 and 90 F and the relative humidity between 20 and 30%. These factors probably further bacteriostasis.

**Family Studies in Respiratory Infections.**—Cruickshank and co-workers (*Brit. M. J.* 1:119, 1958) made a two-year clinical and bacteriological study of respiratory illness in families living in a working class area of London. All families studied consisted of two parents and three children. They were visited by a pediatrician or nurse, who, besides making clinical examinations, took nasal swabs from all members of the family every fortnight. Such possible environmental factors as maternal care, extent of outside contacts, dampness of the house, adequacy of the diet, overcrowding, and kind of clothing worn were analyzed, but only overcrowding and possibly inadequate clothing were found to be associated with the incidence of acute upper respiratory illness. The increased clinical secondary attack rate seen in the more crowded families was confirmed by the higher rate of apparent type-specific transfer of pneumococci in these families. Infections appeared to be most often introduced by the youngest or preschool children, that is by the more susceptible members of the family. Even in overcrowded working-class areas the school child is the most frequently exposed to infection outside the family and is a potent disseminator of infection within the family. This view was confirmed by the greater frequency of transfer of pneumococci and the higher carrier rates of hemolytic streptococci among schoolchildren. The carrier rates for pneumococci were increased after the onset of acute coryza, but there was no evidence that the pneumococci were casually related to the latter.

Changes in the weather appeared to affect the frequency with which colds were introduced into the household and the ease of transfer. This was probably partly due to changes in host susceptibility following abrupt seasonal changes in temperature and other climatic factors. Undue susceptibility to colds was shown to be a characteristic of individual children but not of families as a whole. Sore throats often occurred without members of the family harboring hemolytic streptococci. Sore throat appeared to be a result of more than one type of infection. Sore throats and coryza occurred just as frequently in children without as in those with tonsils although the throats of those without tonsils harbored fewer streptococci.

**Home Care of Elderly.**—A pilot experiment in geriatric rehabilitation in the home was undertaken by the geriatric unit of the Belfast City Hospital (*Lancet*, Jan. 4, 1958). The reason for the study was a belief that some elderly invalids were getting fairly good home care but that their recovery was delayed or even prevented through lack of facilities usually found only in a hospital. Of 272 patients initially referred by their physicians 85 were thought suitable; 37 of these had hemiplegia and 28 had arthritis. In treatment the mainstay was physiotherapy, with emphasis on what the patient and his relatives could do at home. About 56 made a satisfactory recovery. The cost of the treatment averaged $2 for each visit by the physiotherapist, but to get similar results with the patient in the hospital would have cost much more.

Less than a third of the patients referred were suitable, and in making the decision for treatment, good home circumstances were considered as important as a medical condition capable of improvement. For most of the aged sick at home, who would be unlikely to benefit from treatment of this kind, the team believed that more could be done if the existing services were better coordinated. They suggested that every area should have a counseling center for the general practitioner that could provide a skilled social worker to assess the home situation, with power to focus all the necessary services where they are needed.

**Brucellosis Treated with Novobiocin.**—Hitherto no specific antibiotic has been effective in the treatment of brucellosis. Although improvement has been reported with chlortetracycline and streptomycin, relapse occurs later. Gost (*Lancet* 1:191, 1958) reports the successful treatment of 26 patients with novobiocin. Of these, 20 had a positive blood culture and the remaining 6 a positive agglutination test. Treatment was started with the antibiotic when the disease was at its height. By the fifth day of treatment the fever was resolved by crisis and such symptoms as headache, arthralgia, insomnia, and anorexia disappeared. The spleen gradually returned to its normal size. Doses of 250 mg. were given by mouth every four hours until the day after the temperature dropped and then every six hours for nine days. The 26 patients were discharged from hospital without symptoms and no relapse has been reported. The only side-effect noted was an urticarious reaction in two patients.

**National Coal Board Medical Service.**—Since the coal mines were nationalized the National Coal Board has spent $8,400,000 on the development of its medical service. It now employs 77 physicians. The bulk of the capital expenditure has gone on the building and equipping of medical centers at the mines and gas and coke works, which are also controlled by the coal board. About 50 medical centers have been built each year. By the end of 1957, 322 medical centers staffed by nurses and 570 unstaffed centers have been built. Twenty thousand men working in or associated with the coal mines have been trained to give morphine in cases of severe injury, and during the last two years 2,957 injections of morphine have been given. The annual expenditure of the coal board on medical services is about $7.50 per man annually. Later this year a chest radiography scheme will be started in all the mines, and this will increase the annual cost to $8.30 per man.

**Suburban Neurosis.**—There is evidence that a neurosis commonly develops in working class city dwellers who subsequently move to the suburbs. Since the war large blocks of apartments and miniature communities have sprung up in these areas. New surroundings, separation from friends and relatives, higher rents, installment buying, and increases in family have produced social and financial anxieties. Most wage-earners still work in the cities, but the women tend to remain socially isolated in their new homes. This loss of friends, relatives, and the social amenities of the city, together with financial worry, has produced a typical anxiety pattern. Martin and co-workers (*Brit. J. Prev. & Social Med.* 11:196, 1957) investigated the incidence of neurotic and psychotic illness in these emigrants from the cities. As sources of information they used mental hospital admissions, referrals to psychiatric outpatient clinics, consultations with general practitioners, and interviews with the people themselves. Examination of records of admissions to mental hospitals, covering the areas with new housing developments, showed that these admissions were more than 50% above the national average, and the incidence of neurosis was twice as high. Reactive depression in the women was the commonest condition. The discharge rate, however, was high and the period of hospitalization short. Psychiatric outpatient attendances were twice as many as in the neighboring cities.

The general practitioners reported a much higher incidence than would be expected on a national basis of psychosis, anxiety neurosis, sleep disturbances, anorexia, debility, unexplained fatigue, depression, headache, duodenal ulcer, asthma, and allergy. The incidence of most of these was double and in some conditions four times the national average. Direct interviews revealed a self-diagnosis of nervous tension in 22.3%, compared with the expected figure of 12.6%. Neurotic symptoms were most prevalent in those who had only recently moved into their new homes. These symptoms were attributable to loneliness, particularly in the women. It is argued that social planning in these new communities is just as important as town planning. The provision of social amenities might save money at present spent on psychiatric treatment.

**Mass Production.**—"Mass produced gas, mass produced water, and mass produced roads are all very well, but mass produced social and medical services can sometimes do as much harm as good," according to Dr. J. D. Kershaw, health officer for Colchester, in his annual report for 1956.

**Chlorothiazide.**—The result of clinical trials on the new oral nonmercurial diuretic, chlorothiazide (6-chloro-7-sulfanyl-1,2, 4-benzothiadiazine-1, 1-dioxide), were reported by Slater and Nabarro (*Lancet* 1:124, 1958). In vitro it inhibits carbonic anhydrase, but in vivo it causes a great increase in the rate of excretion of chloride and sodium without producing acidosis. The drug was given

to patients with edema due to the nephrotic syndrome and congestive heart failure, and with ascites resulting from portal hypertension. Before treatment with chlorothiazide there was a control period of four to eight days on a diet of fixed sodium and chloride content. Blood pressure and body weight were recorded daily and electrolyte and protein levels of plasma and urine determined by standard methods. The pH of the urine was estimated immediately after collection.

Treatment with chlorothiazide was followed by a prompt and profuse diuresis, with increased excretion of chloride and sodium. In this respect it resembles the diuretic action of the organic mercurial compounds. A different effect, attributable to carbonic anhydrase inhibition, was observed in short-term studies, and this secondary action was thought to be responsible for the hypokalemia produced by chlorothiazide. This was difficult to control by oral potassium supplements. The authors believed that the drug was a most effective diuretic, which could be given for several months without any side-effects except hypokalemia. One patient, however, became resistant to it after two months. They concluded that it might be safer than the mercurials in renal cases, and that it was more effective than acetazolamide and better tolerated than aminometridine. Although chlorothiazide is an effective diuretic, a restricted salt intake was necessary in many patients. It seemed to be well tolerated, and unlike most oral diuretics it rarely produced gastrointestinal upsets. The hypokalemia produced by chlorothiazide must be borne in mind as it may potentiate the toxic effects of digitalis on the heart.

**Carcinoid Tumor Secreting 5-Hydroxytryptophan.**—The syndrome associated with carcinoid metastasizing argentaffinomas was well documented by Sandler and Snow (*Lancet* 1:137, 1958). Many of the manifestations can be attributed to an excess of 5-hydroxytryptamine (5-HT). The authors noted certain atypical features in some of the reported cases and in one of their own patients with carcinoid tumor. Their findings suggest that these belong to a distinct clinical group in which the tumors produce 5-hydroxytryptophan (5-HTP), which is the biochemical precursor of 5-HT. The patient had flushing attacks precipitated by food or alcohol and diminshed by antihistaminic drugs, but not the diarrhea commonly associated with carcinoid tumor. 5-HT was present in the urine with about five times as much 5-HTP and smaller amounts of 5-hydroxyindoleacetic acid. Chromatograms of the patient's urine bore a striking resemblance to those obtained from the urine of six normal subjects given 5-HTP intravenously. It therefore seemed likely that in this case the principal metabolite of the tumor was 5-HTP, which, when released into the bloodstream, was partially decarboxylated to 5-HT. There was also an increased urinary excretion of histamine, which could be accounted for by the fact that 5-HT is a histamine liberator. There may be a distinct clinical group of carcinoid tumors providing 5-HTP rather than 5-HT.

**Cancer Education.**—A report appeared in the *British Medical Journal* of Jan. 11 on the Manchester Committee on Cancer, which has completed the fifth year of an experiment in public education. The campaign emphasized the hopeful outlook for cancers of the breast, cervix uteri, and skin. In towns of Southeast Lancashire and North Cheshire where the scheme has been conducted, over 700 lectures have been given to lay organizations and summarized in local newspapers. Publicity has been maintained at a high level of intensity so that any ill-effects would have come to the notice of general practitioners. The opinions of physicians practicing in the areas concerned were gathered. While only one was skeptical of the usefulness of the scheme, not one thought the scheme harmful. None has been caused any work he considered unnecessarily onerous. The results obtained in this inquiry indicated that it is possible to saturate a given area with carefully devised publicity over a period of years with little or no undesirable consequence for either patient or physician.

**Radiation Hazards.**—The chairman of the Atomic Energy Authority reporting on the accident at the Windscale plant in October recommended the formation of a committee to study and report on health and safety organization in the A. E. A. This committee (*Brit. M. J.* [Jan. 18] 1958) recommended closer cooperation between the eight government departments concerned with atomic energy and more efficient integration of the services of the expert scientific advisers. There are difficulties in staffing in the field of health physics, as it is a recent specialty requiring men trained in medicine, radiobiology, engineering, and general science. The committee suggested that a supply of such men be trained. In such accidents as the one at Windscale, fission products might be released into the atmosphere, and the fall-out of fission products, the degree of contamination of the surrounding pastures and water supplies, and a consideration of the half-lives of the fission products concerned will indicate the potential long-term hazard. Isotopes of strontium and iodine are most important, as both are deposited on pasture and soil, the strontium becoming incorporated in soil and plants. Public knowledge is still lacking on this subject, which makes public relations difficult, people usually fearing what they do not understand.

# CORRESPONDENCE

## RESEARCH CONTROLS

*To the Editor:*—The activities of the American Association of Dental Editors described below had their origin in a disturbing review of the literature by O. B. Ross Jr. appearing in THE JOURNAL (145:72 [Jan. 13] 1951). Ross, in a paper entitled "Use of Controls in Medical Research" reported that of 100 unselected consecutive papers appearing in highly respected medical journals, in only 27% was the research well controlled, in 45% it was uncontrolled, in 18% it was inadequately controlled, and in 10% no controls were possible. The Ross report also emphasized that the experimental control "is not just a tool of highly specialized teachers or research men" but that men at the grass roots of medical practice and theory "must learn to evaluate various treatments and procedures."

The Ross study demonstrated that, wherever the responsibility lies, the job of rejecting manuscripts for publication which do not report suitable experimental controls is not being carried out thoroughly enough. Thus, a study was undertaken (1) to develop the thesis of the essentiality of experimental controls in research; (2) to examine the legitimate possible exceptions or exemptions from this general principle; (3) to delineate at least some of the reasonably acceptable forms of control procedures; (4) to correlate this material into a message encouraging the proper use of controls in research and discouraging the lack or inadequate use of controls; (5) to direct this codification of principle to authors, journal readers, consultants, researchers, and editors; and (6) to provide a backbone of opinion which would serve subsequently to support editors and others accorded the unenviable task of either approving or disapproving the submission of manuscripts for publication or of accepting or rejecting these for publication.

To this end the following resolution was drafted and submitted for the consideration of a distinguished consultant panel of research workers and editors in the fields of medicine, dentistry, and public health, and ultimately for consideration by the American Association of Dental Editors: "In research investigations, the design of the study should include adequate experimental controls. Acceptance for publication of a report of an investigation performed without controls when controls were possible should, if justified, be considered an exception to this principle rather than a sound general practice. The ultimate responsibility (in terms of publication) for allowing such an exception should rest with the editor."

The American Association of Dental Editors unanimously passed the above resolution at its annual meeting in Miami Beach, Fla., Nov. 2, 1957. Since, as an organization of editors, we are urging our members to emphasize the importance of experimental "controls" in their deliberations concerning the acceptability of manuscripts for publication, we felt that other individuals who contribute to and edit the scientific literature would desire to be apprised of the action this association has taken. We sincerely hope that this resolution will assist in further improving the standards of the scientific literature.

AUSTIN H. KUTSCHER, D.D.S.
400 N. Eighth Ave.
Highland Park, N. J.

## PRESCRIPTION LABELS

*To the Editor:*—The introduction of drop medication on a large scale has introduced an unforeseen complication. Parents, accustomed to using drops directly on the area of involvement, i. e., the nose, ear, eye, etc., unwittingly conclude that the newer oral antibiotics are designated for local use. Despite instructions to pharmacists to indicate that the medicament is to be given by mouth, it not infrequently comes to pass that drop medicaments intended to be used orally are instilled in ears, noses, and even eyes. Obviously, this eventuality is fraught with a multiplicity of potential hazards. Many physicians have related such difficulties.

Just as "poison" labels are placed conspicuously on prescriptions of a toxic nature, labels indicating "by mouth," "for ears," "for eyes," etc., should be placed on prescriptions to avoid errors in routes of administration. Several pharmacists have said that the designation "Label as Such" in the instructions of the prescription indicates that the contents of the prescription are to be placed on the label. Most pharmacists state that they are willing to cooperate, whereas others state that such a procedure constitutes not only a violation of ethics but also a potential menace in that self-medication will be encouraged. The purpose of such designations resides in the need to assist the physician in telephone checkups when the records are not immediately available to him. I personally feel that labeling of prescriptions, when feasible, is of great assistance to the physician as a means of follow-up.

RALPH SPAETH, M.D.
9030 S. Bell Ave.
Chicago 20.

# LAW DEPARTMENT

## MEDICOLEGAL ABSTRACTS

**Malpractice: Foreign Substance Left in Body—Res Ipsa Loquitur.**—This was an action for damages for injuries caused by the alleged negligence of the defendant physician. From a directed verdict for the defendant, the plaintiff appealed to the district court of appeal, fourth district, California.

On April 5, 1937, the defendant physician performed an abdominal operation on the plaintiff to correct the position of her uterus and to free adhesions. He testified in this connection that he found that the entire pelvis was filled with a mass of adhesions which anchored the uterus tightly; that these were "freed-up" sufficiently to do the work that was necessary to replace the uterus to its normal position; that the tubes and ovaries were "freed-up" and that an appendectomy was also performed prior to closing due to the fact that they found considerable adhesions and some evidence of chronic scarring about the appendix; that he used surgical gloves; and that before closing, a sponge count was made by the nurse.

During 1938-1940 the plaintiff developed nagging back pains an inch or two above the bottom of her spine, and on July 24, 1953, her coccyx was removed, after which she was relieved of the back pains for a time but later they became worse. In May, 1953, she had a cautery to her cervix for a cervical discharge and in November had a hemorrhoidectomy. On July 7, 1954, Dr. Ragen, who had performed all the 1953 operations, performed an operation for the repair of a cystocele. This operation was performed by entering the vaginal opening and making an inverted T-shaped incision through the mucosa of the cervix on the anterior portion, separating the mucosa, and realigning or drawing them together so as to shorten and make a stronger covering. After this operation the plaintiff had some bleeding and was taken back to surgery. The bleeding was controlled by a product known as oxycel (a synthetic or plastic cloth-like substance which is placed in the wound to absorb the blood and is left to absorb itself). On Jan. 3, 1955, the plaintiff was hospitalized with a diagnosis of cervical stenosis and pyometritis. On Jan. 24, 1955, she was again hospitalized with a diagnosis of right ovarian cyst. A cyst was removed by Dr. Ragen on the next day. It was the size of a small orange and was found to contain a piece of foreign matter approximately 1.5 in. long, 0.5 in. wide, and 0.12 in. thick. Dr. Ragen's assistant testified that he thought it was a piece of either glove, rubber, or rubber tube but that he was not positive that it was rubber.

The pathologist who examined the cyst reported that in it there was a "sponge, that is a piece of gauze in which there was a thin yellow brown material, it was squarish shape, it was about, as I recollect, about a half inch and it looked like rubber and I looked at it microscopically and it had sort of a network that had been pressed through it . . . it was a foreign body"; that "there is nothing like that grows in people"; that there was no way of determining accurately the length of time the foreign substance was in the body; that cysts with a purulent center around a foreign body have been known to be in a human body for months and perhaps years; that considering the place where the foreign substance was found, it could not have gotten into the body through any orifice in the head, through the nose, ears, or mouth, and that there was no other orifice in the human body in which the piece of rubber could have been inserted so that it could have made its way to the place where it was found in surgery; that it was possible that foreign material left in the body in a cystocele operation might cause infection and erode through the peritoneum. One of the experts testified in response to a hypothetical question embodying the plaintiff's case that in his opinion the foreign substance involved must have been introduced at the time of an operation and it was more apt to have been introduced at the time of the cystocele operation.

The court of appeal said that, viewing the evidence in the light most favorable to the plaintiff, accepting every inference that legitimately may be drawn in her favor, and disregarding evidence which is in conflict with evidence favorable to her, we cannot hold that there is no evidence of sufficient substantiality to support a verdict in favor of the plaintiff if such a verdict were given. The only reasonable inference which can be drawn from the evidence is that the foreign substance found in the cyst removed from the plaintiff was left in her body during an operation which was performed on her. While there was some evidence that it was possible that the foreign substance might have been left in the plaintiff's body during the cystocele repair performed in 1954, this evidence merely presented a question of fact for the jury.

The plaintiff contended that the doctrine of res ipsa loquitur is applicable in this case. The defendant argued that the doctrine is inapplicable because of the evidence that the foreign substance could have been left in the plaintiff's body at some other time and place than in the operation by the defendant in 1937. However, said the court, this operation was under the exclusive control of the defendant and the plaintiff was in no way responsible for the foreign material left in her abdomen. There was evidence that there was a mere possibility that the substance was left in her body at

V 1
195

the cystocele repair performed in 1954. The court said that the doctrine of res ipsa loquitur will not ordinarily apply if it is equally probable that the negligence was that of someone other than the defendant, the plaintiff need not exclude all other persons who might possibly have been responsible where the defendant's negligence appears to be the more probable explanation of the accident.

The court therefore held that the case should have been submitted to the jury and the directed verdict in favor of the defendant physician was reversed. *Mondot* v. *Vallejo General Hospital, 313 P (2) 78 (Calif., 1957).*

**Permanent Wave: Res Ipsa Loquitur.**—This was an action for damages for burns resulting from the alleged negligence of one of the operators in the defendant beauty salon. From a judgment for the defendant, the plaintiff appealed to the court of appeals of Ohio.

The plaintiff went to the defendant beauty salon for a cold wave permanent, during the application of which the defendant's agent used a preparation and solution called Willat Dynacurl Cold Wave Lotion. Some of this solution was spilled on the plaintiff's face, neck, and forearms. About six hours later the area was covered with red blotches, in the form of contact dermatitis, and this condition remained for about three weeks. At the trial, the plaintiff offered proof tending to establish that the defendant's agent had been negligent in spilling the solution on the plaintiff. The defendant then offered evidence to establish that the plaintiff was allergic to some of the chemicals contained in the solution used and that this allergic reaction was the sole cause of the plaintiff's injuries.

The plaintiff's principal complaint on appeal was directed at the refusal of the trial court to give the jury an instruction on the doctrine of res ipsa loquitur. We are of the opinion, said the court of appeals, that the trial court did not err in refusing the request, for the record discloses facts upon which it could be inferred that the plaintiff's injuries were caused by her own allergy in addition to any facts which might permit an inference that the defendant's operator was negligent. This evidence, said the court, was insufficient to do more than raise a possible inference, but it was sufficient to convince the jury that the plaintiff's injury was in fact caused by her own allergy. One of the special findings of the jury was "(3) Was Mrs. Gephart's condition due to an allergic reaction to some of the solutions used in giving the permanent wave? Answer: Yes."

Res ipsa loquitur, said the court, is a rule of evidence which permits, but does not require, the jury to draw an inference of negligence in a case where the instrumentality causing injury is shown to have been within the exclusive management and control of the defendant and where the circumstances attending the injury were of such a character in themselves as to warrant the conclusion that a lack of ordinary care on the part of the defendant was responsible for the occurrence or condition causing the injury. The evidence here, concluded the court, does not disclose that circumstances attending the injury were of such a character as to warrant the only conclusion that a lack of ordinary care on the part of the defendant was responsible for the condition causing the plaintiff's injury. It could have been caused by either of two conditions: (1) the defendant's negligence or (2) the plaintiff's allergy.

The court refused to disturb the finding of the jury, and the judgment in favor of the defendant was affirmed. *Gephart v. Rike-Kumler Co.* 145 N. E. (2) 197 (Ohio, 1956)

## MEDICAL FILM REVIEWS

**Technique of Proctoscopy:** 16 mm., color, sound, showing time 17 minutes. Prepared in 1956 by Raymond J. Jackman, M.D., Rochester, Minn. Procurable on loan from Photography Department, Mayo Clinic, Rochester, Minn.

In this film, the author states that about 70% of all the diseases that involve the entire five feet of large intestine can be diagnosed by proctoscopy and gives his reasons for using this procedure before turning to roentgenographic studies. The technique of passing the proctoscope is demonstrated on a sagittal section of the pelvis, as well as in endoscopic photographs on a live model. It is an excellent portrayal, step by step, from the taking of a proctologic history to the completion of the proctosigmoidoscopic examination. The narration is clear and concise, and the viewer receives an additional treat, in that he sees exactly what the examiner sees through the medium of endoscopic motion pictures in color. This film is highly recommended for students, house officers, and physicians who wish to become proficient in the technique of proctoscopy.

**Management of the Neglected Third-Degree Burn with Demonstration of the Several Instruments for the Cutting of Skin Grafts:** 16 mm., color, sound, showing time 27 minutes. Prepared in 1956 by Herbert Conway, M.D., New York. Procurable on loan from American Cyanamid Corporation, Danbury, Conn., or American College of Surgeons, 40 E. Erie St., Chicago 11.

The purpose of this film is to demonstrate the details of management of the chronic granulating wound and its preparation for the successful use of skin grafts. In addition, there is a demonstration of the use of several of the newer types of instruments for the cutting of skin grafts, as well as the procurement of skin grafts by hand-manipulated knives. Emphasis is placed on the postopera-

tive dressing care and on the use of skeletal traction in the management of soft tissue wounds of the extremities in order to facilitate the frequent reapplication of dressings. The title of this film is somewhat misleading, since only a few minutes of the film are used to describe the management of the neglected third-degree burn. Most of the film concerns a demonstration of the use of various skin-grafting instruments. However, even for the plastic surgery resident, there is too quick a transition from one to the other without due demonstration. This film would be useful in teaching general surgery residents and first year plastic surgery residents. It would also be of interest to interns.

**Care and Sterilization of Surgeons' Gloves:** 16 mm., color, sound, showing time 13 minutes. Presented by the Wilson Rubber Company, Division of Becton, Dickinson and Company. Produced in 1957 by Mervin LaRue, Inc., Chicago. Procurable on loan from Becton, Dickinson and Company, Rutherford, N. J.

The methods demonstrated in this film are based on a national survey to determine the most effective, efficient, and economical method of washing and sterilizing surgeons' gloves and other latex products. A method of cleansing, drying, powdering, wrapping, autoclaving, culturing, and storing is portrayed for both large and small hospitals. The purpose of the film is to present methods which will protect gloves against adverse effects of repeated handling, washing, and sterilization. On the whole, the material and the manner in which it is presented is good. Alternate methods are mentioned, such as washing of gloves by hand or by machine. Interspersed throughout the film are the reasons for certain procedures. The photography is excellent. The film is recommended for showing to all who use surgeons' gloves and would be especially valuable for nurses and nurses aides.

**Coccidioidomycosis: Its Epidemiologic and Clinical Aspects:** 16 mm., color, sound, showing time 19 minutes. Technical Advisers: Roger Egeberg, M.D., Veterans Administration Center, Los Angeles, and Libero Ajello, Ph.D., Communicable Disease Center, Atlanta, Ga. Produced in 1956 by and procurable on loan from Communicable Disease Center, 50 Seventh St. N.E., Atlanta, Ga., and Veterans Administration, Central Office Film Library, Washington 25.

The purpose of this film is to acquaint trainees with the environment and natural conditions under which Coccidiodes immitis occurs. Although coccidioidomycosis is endemic to the southwestern part of the United States, the disease is often brought to other regions by travelers. Included in the film are the following subjects: (1) distribution and ecology of the etiological agent, Coccidiodes immitis; (2) clinical aspects of the benign and disseminated forms (shown through x-ray films, actual cases, and animation); (3) variations in the symptomatology; (4) histology; (5) serology; and (6) laboratory procedures for isolation and identification of the fungus. This worthwhile film mentions practically all phases of the disease, and several patients with skin and bone manifestations are shown. There is also a good description of the development of the organism itself and its appearance on culture and in tissue. The photography is good, and the film is highly recommended for general practitioners, residents, interns, and medical students.

**Reconstitution of the Lung:** 16 mm., color, sound, showing time 12 minutes. Prepared by the surgical staff of the Veterans Administration Hospital, Sun Mountain, N. Y. Produced in 1956 by and procurable on loan from Veterans Administration, Central Office Film Library, Washington 25.

The purpose of this film is to show representative segmental and bisegmental resection in right or left upper lobes and to discuss various operative situations and methods of reconstitution. Scenes showing each step and important structure in detail illustrate the manner in which the resulting defect is repaired or reconstituted. Operative situations and important complications of segmental resection which are seen to occur often are illustrated, and the methods of reconstitution are discussed. Also displayed is a technique for uniting the segments and closing the defect, which is an important point in the procedure of segmental pulmonary resection. The photography is satisfactory, and the film should be of particular interest to thoracic surgeons.

## NEW FILM ADDED TO A. M. A. MOTION PICTURE LIBRARY

**First a Physician:** 16 mm., color, sound, showing time 27 minutes. Produced in 1956 by Audio Productions, New York, with the cooperation of the American College of Radiology. Presented by Photo Products Department, E. I. du Pont de Nemours and Co., Inc. Procurable on loan (service charge $1.00) from Motion Picture Library, American Medical Association, 535 N. Dearborn St., Chicago 10.

This nontechnical film is designed to portray the important role of the radiologist—a physician specializing in the use of x-ray, radium, and radioactive isotopes. Delineating a day in the life of a radiologist to show his training, activities, and importance, it authentically depicts facets of diagnostic and therapeutic radiology in the finding and treatment of various human ailments and diseases, including cancer. In addition to the radiologist, the following members of the medical team are shown: family physician, surgeon, intern, nurse, psychiatrist, x-ray technician, and anesthesiologist and his assistants. These locate and confirm, by angiography, a blood clot which is endangering the life of a boy. The photography is excellent. The film stresses the importance of teamwork in medicine. It is recommended for lay organizations, such as service clubs, and for student x-ray technicians, student nurses, and medical students.

V 1
195

# MEDICAL LITERATURE ABSTRACTS

## INTERNAL MEDICINE

**Acquired Toxoplasmosis: Observations on Two Parasitologically Proved Cases Treated with Pyrimethamine and Triple Sulfonamides.** D. E. Kayhoe, L. Jacobs, H. K. Beye and N. B. McCullough. New England J. Med. 257:1247-1254 (Dec. 26) 1957 [Boston].

The authors report on 2 patients with proved acquired toxoplasmosis, who were effectively treated with triple sulfonamides (equal amounts of sulfadiazine, sulfamerazine, and sulfamethazine). One patient, a 31-year-old research worker in a toxoplasmosis laboratory, became ill 6 days after he had scraped 1 finger of his hand with the needle while injecting laboratory mice with peritoneal exudate obtained from animals which were injected with RH strain of Toxoplasma gondii. The wound was superficial. Symptoms consisted of myalgia, headache, a rash, and fever. There was generalized lymphadenopathy, with lymphocytosis, atypical lymphocytes, and anemia. The serologic tests for toxoplasmosis became positive, and Toxoplasma organisms were recovered from the blood and later from an excised axillary lymph node. On the 15th day after the accident, specific chemotherapy was begun, consisting of oral administration of pyrimethamine and triple sulfonamides; 50 mg. of pyrimethamine was given as a loading dose, followed in 6 hours by 25 mg. and then by 25 mg. administered daily for 20 days; 1 mg. of triple sulfonamides was administered every 4 hours. The patient became afebrile within 36 hours, the lymphadenopathy and the skin rash subsided, and a marked subjective improvement was noted. The Toxoplasma dye test titer fell slightly during the treatment, and discharge took place after the completion of treatment. Seven weeks later the patient had a recurrence of the lymphadenopathy, with an increase in the dye test titer. A lymph node which was removed showed continuing disease, but Toxoplasma organisms were not isolated from this tissue. The patient became well without further treatment and has remained in good health for the past 18 months. The case of this patient illustrates the ease with which the infection can be acquired through a laboratory accident.

The second patient, a 48-year-old housewife, had a history of thyrotoxicosis, with the removal of a thyroid adenoma, and successful maintenance therapy with 60 mg. of desiccated thyroid administered daily for the next 5 months. Three weeks after the thyroid treatment was discontinued, peripheral neuropathy and then ocular complaints, followed by fever and lymphadenopathy, developed. The patient was treated daily for 5 days with intramuscular injections of penicillin without improvement; cervical, inguinal, and axillary lymphadenopathy then developed. The patient, whose blood count revealed 20,000 leukocytes per cubic millimeter, with 9% segmented cells, 2% basophils, and 89% lymphocytes, was suspected of having acute lymphatic leukemia. She was found to have a high Toxoplasma dye test titer. She had frequently eaten sandwiches made of raw ground beef and had eaten raw meat about two weeks before the onset of fever. Toxoplasma organisms were isolated from the lymph node and the gastrocnemius muscle tissue. Chorioretinitis developed, and the patient had persistent lymphocytes and increased protein in the spinal fluid. Treatment consisted of administering 50 mg. of pyrimethamine orally and daily for 2 days and then 25 mg. daily for the next 28 days. During the same period the patient received triple sulfonamides by mouth in a dosage of 0.5 mg. 4 times a day, increased after a brief period of intolerance to 1 mg. 4 times a day for a total of 30 days. There was a prompt and dramatic clinical response, with subsidence of the lymphadenopathy and healing of the ocular lesions. After the completion of 30 days' treatment, a repeat biopsy of lymph node specimen yielded Toxoplasma organisms on animal inoculation. The organisms were also isolated from a lymph node removed 66 days after treatment. The case of the second patient emphasizes the clinical similarities in leukemia, infectious mononucleosis, and acute toxoplasmosis. It also suggests a possible relation between toxoplasmosis and thyroid disease. This is the first parasitologically proved case reported, with chorioretinal lesions developing in the acute or subacute stage of the disease. The recovery of parasites from the patient's tissues after treatment suggests that the drugs may have a suppressive rather than a curative action. Skin tests for toxoplasmosis remained negative for more than 60 weeks after onset of symptoms in both patients.

The place of publication of the periodicals appears in brackets preceding each abstract.

Periodicals on file in the Library of the American Medical Association may be borrowed by members of the Association or its student organization and by individuals in continental United States or Canada who subscribe to its scientific periodicals. Requests for periodicals should be addressed "Library, American Medical Association." Periodical files cover 1949 to date only, and no photoduplication services are available. No charge is made to members, but the fee for others is 15 cents in stamps for each item. Only three periodicals may be borrowed at one time, and they must not be kept longer than five days. Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

**Oral Maintenance Treatment of Pernicious Anemia with Vitamin $B_{12}$ and Swine Intrinsic Factor.** P. Bastrup-Madsen. Nord. med. 58:1233-1239 (Aug. 22) 1957 (In Danish) [Stockholm].

In 25 patients with pernicious anemia, maintenance treatment with intrinsic factor from swine pyloric mucosa and vitamin $B_{12}$ was applied. Since the effect of orally administered preparations can be capricious, patients with more marked neurological symptoms were given injection treatment. In most cases of pernicious anemia an initial complete hematological remission can be reached by oral treatment with intrinsic factor and vitamin $B_{12}$, and in some cases maintenance treatment will give complete hematological remission and normal $B_{12}$ values in the serum for several years. Oral treatment, however, is not ideal as the standard treatment of pernicious anemia. In spite of good initial reaction, in not a few cases hematological relapse occurs after treatment for a time, and in other cases vitamin $B_{12}$ values in the serum are low, even though the hematological remission is satisfactory. The author cautions against application of the oral treatment and says that it should be given only if the vitamin $B_{12}$ concentration in the serum is used as the line of guidance for the treatment.

**Leukemia Following Roentgen/Radium Therapy.** A. Voll and J. Tveit. Nord. med. 58:1114-1117 (Aug. 1) 1957 (In Norwegian) [Stockholm].

Of 31 patients with definitely diagnosed leukemia admitted from 1950 to 1956, the 10 with acute leukemia or chronic myelogenous leukemia had had roentgenotherapy or radiotherapy for various disorders for a shorter or a longer period. None of the patients with chronic lymphatic leukemia had received such treatment. While the treatment was in most cases spread over a number of years, a summation effect cannot be ignored. Six of the 10 patients had been given relatively large total roentgen doses. Comparison with reports from other quarters seems to indicate a causal relation between acute and chronic myelogenous leukemia and irradiation for different diseases from one to several years before the onset of the leukemia symptoms.

**Mouse Allergy: Case Report.** A. H. Sorrell and J. Gottesman. Ann. Allergy 15:662-663 (Nov.-Dec.) 1957 [St. Paul].

A 22-year-old woman presented the following history. She had been doing research exclusively with mice for 2 years and for the last 6 months had been working only with Swiss mice (strains C57 and C58). Three months after she had started to work with these mice she had nasal stuffiness and sneezing whenever she worked in the mouse room. These symptoms were present only in this room or in its immediate vicinity; elsewhere, in or out of the hospital, she was free of all nasal complaints. A scratch by a mouse would produce a wheal accompanied by erythema and pruritus. Specific allergy to mouse dander was proved by positive direct and indirect skin tests. Hyposensitization therapy with an autogenous extract was instituted. This produced considerable improvement.

## SURGERY

**Mucoid Impaction of the Bronchi: A Study of 36 Cases.** R. R. Shaw, D. L. Paulson and J. L. Kee Jr. Am. Rev. Tuberc. 76:970-982 (Dec.) 1957 [New York].

The authors report on 20 male and 16 female patients, between 14 and 60 years of age, with mucoid impactions of the bronchi, which were located in the segments of the upper lobes in 24 patients, in the lower lobes in 5, and in the lingula or middle lobes in 3. Four patients had multiple regions of involvement. Thirty of the 36 patients had a history of asthma or chronic obstructive bronchitis, 26 had cough and expectoration of purulent sputum, 17 had a localized pleuritic type of pain, 16 remembered having coughed up hard rubbery plugs of mucus, 14 had fever, 13 had frequent upper respiratory infections, and 11 had episodes of hemoptysis; weight loss associated with severe pulmonary infection occurred in 5. Twenty-two patients were operated on, and 14 were treated by medical measures. In general, medical management was advised for the patients with multiple diffuse impactions, and surgical removal for those having localized disease. Segmental resection was performed in 6 patients, and lobectomy in 16. Roentgenologic examination of the chest proved to be the most valuable single measure for diagnosing and evaluating the course of the condition. The main diagnostic value of bronchoscopy was in excluding the presence of a neoplasm in patients over 40 years of age. Bronchography may reveal not only the obstruction of the bronchi but also the cystic bronchiectasis in other segments which remains as the residuum of previous episodes of mucoid impaction.

Of the 22 patients operated on, 1, a 15-year-old boy with bilateral cystic bronchiectasis, died 8 hours after an attempted segmental resection, in the course of which cardiac arrest had occurred. The death of 1 patient, 7 years after the surgical intervention, resulted from progressive pulmonary infection. Three patients were asymptomatic before the surgical intervention. Sixteen of the remaining 17 patients were definitely improved after the surgical intervention. Twelve of the 14 patients treated medically were unimproved. Pathological examination of the operative specimens revealed that suppuration occurred beyond the blocked bronchi and that the bronchial wall underwent destruction.

Mucoid impaction of the bronchi should be considered in the differential diagnosis of any patient who has a history of asthma and complains of recurrent respiratory infections associated with hemoptysis and pain.

**Synthetic Materials as Vascular Prostheses: I. A Comparative Study in Small Vessels of Nylon, Dacron, Orlon, Ivalon Sponge and Teflon.** J. H. Harrison. Am. J. Surg. 95:3-15 (Jan.) 1958 [New York].

Grafts of nylon, polyethylene glycol terephthalate (Dacron), polyacrylonitrile (Orlon), formalized polyvinyl alcohol sponge formulation (Ivalon sponge), and polytetrafluoroethylene (Teflon), with a wide range of chemical and physical properties, were inserted into the abdominal aorta and the carotid and femoral arteries of 133 dogs. Frozen, dried homografts were inserted into the abdominal aorta of 10 dogs as controls. The best and only satisfactory results were obtained with woven, purified Teflon tubes; the 6.3% rate of occlusion associated with this synthetic material compared favorably with 10% occlusion rate associated with homografts. Nylon grafts were accompanied by a high rate of thrombosis, and the thickness of the fibrous enclosure eliminated much of the advantage of nonbuckling in the crimped tubes. Dacron was considered better than nylon, but the thickness of the fibrin lining and the high rate of occlusion made it unsatisfactory for replacing small vessels. Knitted tubes of Orlon were too porous and were complicated by excessive delayed bleeding, with hematomas around the graft. Molded grafts of Ivalon sponge were unsatisfactory because of breakdown, with aneurysm and/or rupture.

Grafts with a longitudinal seam are inferior to prewoven or molded tubes. The latter will have less wrinkles and can be inserted with smoother anastomotic lines. Synthetic grafts must be inserted under slight tension, as loose insertion will allow buckling with a high rate of occlusion. Solid tubes will not remain patent in small vessels, and grafts with an air porosity of over 50 are too porous. Between these extremes the rate of healing is dependent as much on the reaction incited by the synthetic material as on the porosity of the graft. None of the synthetic prostheses studied proved satisfactory for replacing blood vessels less than 5 mm. in diameter.

**Synthetic Materials as Vascular Prostheses: II. A Comparative Study of Nylon, Dacron, Orlon, Ivalon Sponge, and Teflon in Large Blood Vessels with Tensile Strength Studies.** J. H. Harrison. Am. J. Surg. 95:16-24 (Jan.) 1958 [New York].

Grafts of nylon, Dacron, Orlon, Ivalon sponge, and Teflon were inserted into defects of the thoracic aorta of 84 dogs. Tensile strength determinations were made on the synthetic materials making up the grafts for periods of up to 2 years with the Instron apparatus, a highly sensitive electronic weighing system employing bonded wire strain gauges for detecting and recording the tensile load applied to the sample under test. A stress strain curve was plotted. Maintenance of patency was no problem, as only 1 graft became occluded and this was secondary to a hematoma. Nylon underwent rapid degeneration after implantation in the body. This was complete in 1 graft, resulting in a dissecting aneurysm that ruptured through its fibrous enclosure and a bronchus. Nylon is considered unsatisfactory as a vascular prosthesis. Ivalon sponge proved to be unsatisfactory because of rapid breakdown, with aneurysm and rupture of the grafts. Orlon, Dacron, and Teflon maintained their strength during the period of observation. Teflon is considered the material of choice, as it is chemically more inert and would be expected to lose less strength after longer periods of time. Further follow-up studies are in progress.

**A Critical Review of One Hundred and Sixty Consecutive Scalene Node Biopsies.** S. M. Scott. Am. Rev. Tuberc. 76:1002-1006 (Dec.) 1957 [New York].

Scalene lymph node biopsies were performed on specimens from 160 patients, 64 of whom had carcinoma of the lung, 15 had Boeck's sarcoid, 28 had tuberculosis, 3 had tuberculosis associated with silicosis, 7 had silicosis, 3 had carcinoma of the esophagus, 2 had lymphoma, 3 had histoplasmosis, and 35 had various other conditions. A positive histological diagnosis was made with the aid of the scalene lymph node biopsy in 33 (20.6%) of the 160 patients. Those with primary carcinoma of the lung comprised the largest individual group for whom scalene lymph node biopsy was performed. The scalene lymph nodes of 10 (15.6%) of the 64 patients with carcinoma of the lung were positive for neoplastic disease. Bronchoscopy and sputum examinations failed to reveal histological or cytological evidence of carcinoma in the 10 patients. Bronchoscopic biopsy led to the finding of carcinoma in 22 patients (34.4%). The carcinoma lesion was operable in 40 of the 54 patients with normal scalene lymph nodes; in 21 of these (39%), the lesion was resected. One patient with carcinomatous disease in the scalene lymph node was operated on, but the lesion was not resected.

The scalene lymph node biophy is a valuable diagnostic adjunct. Positive results will be more easily obtained in cases of hilar adenopathy or diffuse bilateral pulmonary infiltration. The roentgenographic appearance, however, should not limit the use of the procedure in patients with undiagnosed pulmonary or mediastinal lesions. A scalene lymph node biopsy supplements other established diagnostic routines. A positive finding of carcinoma

by biopsy is a contraindication to exploration for carcinoma of the lung. The value of the procedure is directly proportional to the skill of the operator. If no lymph nodes are obtained, the biopsy is inadequate. Positive findings in biopsy specimens must be interpreted along with the clinical findings. Granulomatous lesions are not always sufficiently specific to resolve a doubtful diagnosis.

**Ligation of the Inferior Vena Cava in Cardiac Decompensation.** E. G. Burmenko. Sovet. med. 21:104-108 (No. 10) 1957 (In Russian) [Moscow].

The author reports on 76 patients subjected to ligation of the inferior vena cava. The age of the patients was from 19 years to 48 years. The duration of illness varied between 3 and 12 years. Thirty-nine patients had predominantly stenosis of the mitral valve. Thirty patients showed predominant insufficiency of the mitral valve. In 7 patients the 2 lesions were present in the same degree. The majority of the patients had both involvement of the mitral valve and insufficiency of the tricuspid valve. Twenty-four patients who were operated on had ascites, anasarca, and extensive peripheral edema. Two patients were threatened with pulmonary edema. The remaining 50 patients exhibited manifestations of stasis in the greater and lesser circulations but with moderate ascites and edema. All the patients were referred by internists after a prolonged but ineffective conservative treatment. In the preoperative period the patients were treated with cardiotonics, intravenously administered dextrose, diuretics, and vitamins. In the immediate postoperative period the mortality amounted to 16.8%. Twelve per cent of the patients showed no improvement, but there was relative improvement in 22.2% and considerable improvement in 49.2%. Analysis of these results suggests that ligation of the inferior vena cava does not necessarily prevent pulmonary edema.

Postmortem studies demonstrated a pronounced stenosis of the mitral valve, while in 30 of the 76 patients operated on there was predominant insufficiency of the mitral valve. The late postoperative results were as follows: 9 patients died 4 months to 1½ years later, and 7 patients died because of progressive circulatory failure after 4 months, 8 months, and 1½ years. Those who died showed in the preoperative period ascites, anasarca, hydrothorax, and extensive peripheral edema. Improvement was noted in 14 patients. Satisfactory results were observed in patients with manifestation of stasis in the lesser and minor circulation but without pronounced ascites and edema. The author concludes that ligation of the inferior vena cava is indicated (1) in stenosis of the mitral valve with circulatory failure in the absence of effective conservative treatment, (2) in stenosis of the mitral valve with repeated episodes of decompensation, and (3) in stenosis of the mitral valve without pronounced changes in circulation, when attempt at activity leads to rapid recurrence of decompensation. The operation is indicated more in patients who will later be subjected to commissurotomy. The operation is contraindicated (1) in the presence of definite changes in the myocardium with long-existing fibrillation resistant to medical treatment, (2) in active rheumatic carditis, and (3) in sclerosis of the liver. The author feels that ligation of the inferior vena cava is a palliative operation and that after a shorter or a longer period of time the patients will again develop disturbances of cardiovascular activity. The operation is justified when all other therapeutic measures have failed.

**Combined Antibiotics in the Surgical Treatment of Chronic Pulmonary Suppuration.** V. I. Struchkov and A. M. Marshak. Sovet. med. 21:28-31 (No. 9) 1957 (In Russian) [Moscow].

The authors report on 315 patients treated for chronic pulmonary suppurative disease. Two hundred twenty-three of these were subjected to surgical intervention. Pneumonectomy was done in 79, bilobectomy or lobectomy in 123, while 21 were treated by ligation of pulmonary vessels, partial thoracoplasty, and the like. The majority of the patients were admitted to the clinic in the acute stage of infection, with high temperature and profuse expectoration. The authors stress the importance of combined antibiotics in the preoperative treatment of these patients. Combination of antibiotics is indicated in order to obviate the development of drug tolerance in the patient, as well as the emergence of resistant strains of microbes. In some of the patients, combination of penicillin with streptomycin proved ineffective, particularly in those who had been previously treated with these antibiotics for long periods of time.

Of the recently developed combinations, biomycin with Novocain and Terramycin with Novocain given intramuscularly proved particularly effective. The study of the absorption of these combinations in 30 patients showed a high concentration of them in the lungs of the patient. Penicillin and streptomycin were employed in the preoperative treatment in the form of an aerosol. Sulfanilamide preparations were also employed, together with antibiotics. Silk sutures used in the closure of the bronchial stump and in ligation of the large vessels were impregnated with penicillin. Treatment with antibiotics is continued for from 10 to 12 days in the postoperative period. As prophylaxis, combinations of penicillin with streptomycin and sulfadimensin are given. Tetracycline is administered if signs of infection appear. The combined treatment given to 75 patients made it possible to stage the operation in

V 16
1958

the phase of remission, while the earlier employment of streptomycin and penicillin alone resulted in the necessity of subjecting 5% of the patients to operation during the stage of exacerbation of the infectious process.

**Adrenalectomy in Treatment of Advanced Cancer.** M. Dargent, M. Mayer and P. Blondet. Semaine hôp. Paris 33:4253-4266 (Dec. 20) 1957 (In French) [Paris].

The authors report on 44 patients, 39 women and 5 men, with advanced cancer, who underwent adrenalectomy. Thirty-eight of the 44 patients had cancer of the breast, 4 had cancer of the prostate, 1 had cancer of the testis, and 1 had diffuse cancer of the uterine cervix. Five patients had unilateral adrenalectomies, and 39 had bilateral adrenalectomies. Thirty-eight of the 39 bilateral adrenalectomies were performed in 2 stages, and 37 were performed first on the right side. Right-sided adrenalectomy was combined with castration in 16 of the 39 patients with bilateral adrenalectomy. Thirty-one of the 44 patients were followed up for more than 6 months to 2½ years postoperatively.

There were 3 postoperative deaths resulting within a few hours to 4 days; those were from acute adrenal insufficiency in 1 patient, from respiratory paralysis in 1 patient with multiple and particularly cerebral metastases of carcinoma of the prostate, and from asphyxia in 1 patient with cancer of the breast associated with diffuse carcinosis of the pleura, asthma, and cardiac failure. Good subjective results, consisting of relief of pain, recovery of sleep, and euphoria, were obtained in 16 of the 31 patients, and excellent results were obtained in 6 in whom these improvements were maintained for at least 6 months. The remaining 6 patients did not obtain any subjective improvement. Objective results were much less satisfactory; 12 of the 31 patients did not obtain any objective improvement, 10 obtained good results in that the spread of the cancerous process in the soft tissues or the osteolysis from bone metastasis receded for from 2 to 6 months, and 6 obtained excellent results with disappearance of visceral, pulmonary, bone, and lymph node lesions for at least 6 months. An increased amount of follicle-stimulating hormone was determined in these 6 patients, 1 of whom had cancer of the prostate and 5 had cancer of the breast. The anatomicopathological study of the removed adrenal glands revealed metastases in 13 of the 44 patients; all 13 patients had cancer of the breast.

These data show that excellent subjective and objective results, particularly concerning the bone lesions or the soft tissue lesions, may be expected in 1 out of 5 or 6 patients. An increase in the amount of follicle-stimulating hormone after the adrenalectomy may generally be considered as a favorable prognostic sign. Adrenalectomy is indicated in patients with advanced cancer of the breast and the prostate, and particularly in patients of the first group in whom ovariectomy should be performed as a first-stage procedure; bilateral adrenalectomy in 1 stage should be taken into consideration after ovariectomy if the latter provides definite relief of pain and of acute peritumoral phenomena in the soft tissues, suggesting an estrogenic dependence of the lesions. Cardiorenal insufficiency and severe respiratory insufficiency are formal contraindications to adrenalectomy. Diffuse bone metastases, pleuropulmonary metastases without considerable respiratory insufficiency, and choroidal metastases are excellent indications to adrenalectomy.

The major inconvenience associated with bilateral adrenalectomy is that the patients must be subjected permanently to steroid substitution therapy. In an attempt to make this therapy dispensable, the left adrenal was implanted into the spleen after ovariectomy, and right-sided adrenalectomy was performed on 2 women with advanced cancer of the breast; these patients were followed postoperatively for more than 3 months. Early results seemed to be highly encouraging.

**Ligation of Ankle Communicating Veins in the Treatment of the Venous-Ulcer Syndrome of the Leg.** H. Dodd, A. R. Calo, M. Mistry and A. Rushford. Lancet 2:1249-1252 (Dec. 21) 1957 [London].

The authors began ligating ankle communicating veins in patients with venous-ulcer syndrome of the leg in 1953, when it was described by Cockett and Elgan Jones. They performed extrafascial ligation of 2 or 3 communicating veins passing through the deep fascia behind the lower third of the tibia. Later, they adopted the radical subfascial ligation of the communicating veins of the lower leg. They diagnose incompetence of the ankle communicating veins from the history, examination of the limb, tourniquet tests, and occasionally by venography. There is often a history of deep thrombosis in one or both legs, associated with an accident, fracture, illness, operation, or pregnancy. The authors rarely operate in the presence of an ulcer or of eczema. These are healed first by ambulatory pressure bandaging. The incision runs ¾ in. behind and parallel to the posterior border of the tibia for 10 in., finishing behind the internal malleolus. It is deepened through the deep fascia, which may be thick and dense. There are 3 phases of the operation: division of the medial, calf, lateral, and other perforating veins; closure of the skin; and application of the pressure bandage.

Ligation of incompetent ankle communicating veins has been carried out in 174 patients, of whom 110 had had a previous operation for varicose

veins, but the ulcer syndrome had returned. There were 129 women and 45 men. Thirty-seven of the patients had bilateral vein ligations, that is, a total of 211 limbs were operated on. No patient died or developed deep thrombosis, embolism, or acute sepsis. Good results were obtained in 135 and fair results in 21 of the 174 patients. In 12 patients the results were unsatisfactory, and 6 patients could not be traced. Of 96 patients seen 2 or more years after their operation, 86 showed a good or a fair result, and only 6 an unsatisfactory one. The authors realize that a significant follow-up should extend for at least 5 years, but the present survey seems encouraging.

**Contribution to the Study of the Problem of Regenerated Function of the Sympathetic Nervous System Which Was Suppressed by Surgery: Electrical Skin Resistance Before and After Lumbar and Thoracic Ganglionectomy.** W. Montorsi, C. Ghiringhelli, G. Tiberio and F. Lavorato. Minerva cardioangiol. 5:354-370 (Sept.) 1957 (In Italian) [Turin, Italy].

Electrical skin resistance has become important to surgeons dealing with the sympathetic nervous system in order to establish the extent of the denervated area after sympathectomy and its possible regeneration. Studies of electrical skin resistance for a period of 3 years were done on 70 patients, of whom 55 were subjected to lumbar ganglionectomy for chronic obliterating arteriopathy and 15 were subjected to thoracic ganglionectomy for Raynaud's disease. The tests were carried out before, a few weeks after, and 3 years after the operation. Patterns of electrical skin resistance obtained before the operation showed gradual decrease in values when proceeding from the proximal (between 1.5 and 3 million ohms) toward the distal parts of the extremities (between 50,000 and 200,000 ohms). Values of electrical skin resistance tests of the distal part of the extremities on the same side of the area operated on increased considerably 3 to 5 weeks after operation (several million ohms). Skin resistance values recorded 3 years after the operation decreased in comparison with those observed a few weeks after the operation, although in most patients they were higher than those observed before the operation.

Patterns of electrical skin resistance thus revealed a gradual and moderate regeneration of the sympathetic nervous system after lumbar or thoracic ganglionectomy. A marked regeneration of the sympathetic nervous system was observed only in a few patients 3 years after the operation. The opinion of the authors is that regeneration is brought about either through fibers which innervate the adjacent areas or through fibers in the spinal nerves which have no connection with the lateral vertebral ganglions.

## GYNECOLOGY & OBSTETRICS

**The Special Problem of Rheumatic Heart Disease in Pregnant Women.** C. S. Burwell. A. M. A. Arch. Int. Med. 101:60-66 (Jan.) 1958 [Chicago].

Observations were made during a 6-year period on 277 pregnant women with heart disease. Rheumatic heart disease accounted for 85% of the heart lesions in this group, while almost all the other lesions were of congenital origin. Mitral stenosis presents the major problem in about two-thirds of pregnant women with heart disease. The pregnant woman with mitral stenosis has a higher left atrial pressure. The elevated left atrial pressure is due to an elevated ventilation volume. There are three varieties of approach to the management: 1. The problem may be avoided by terminating the pregnancy. This is not a good solution, however, because the fetal mortality is 100%, there is some risk to the mother, and psychologically the effects are generally bad. 2. To modify the mitral stenosis by surgery during pregnancy is not a good solution, partly because it is almost never necessary and partly because of certain special risks of cardiac surgery in a pregnant woman. 3. Conservative medical management is the possibility which is the most sensible and most successful.

There were 3 maternal deaths in 298 pregnant women with rheumatic heart disease. One patient with aortic stenosis died suddenly after the interruption of pregnancy, 1 patient with a twin pregnancy died some weeks after mitral valve surgery (which had not been advised by the author), and 1 patient with aortic disease died of micrococcic (staphylococcic) pneumonia. On the basis of this experience the author concludes that in terms of immediate maternal mortality the results of conservative management are good. In the vast majority of instances it is possible to carry women with heart disease safely through pregnancy. Success depends on the understanding and careful application of the principle of the total cardiac burden in pregnancy and of other aspects of the patient's life which influence this burden. The success with which the principle can be applied depends on the cooperation of the patient, the persuasiveness of the physician, and the availability of appropriate services in the community.

**Endometrial Adenocarcinoma Eleven Years After Pelvic Radiation for Cervical Epidermoid Carcinoma.** W. G. Pace and L. Barnes. Am. J. Obst. & Gynec. 75:175-179 (Jan.) 1958 [St. Louis].

The case reported is of particular interest not only because it presents the appearance of endometrial adenocarcinoma 11 years after successful therapy with radium for carcinoma of the cervix but also because it demonstrates the appearance

V 1
195

and progression of adenomatous cystic hyperplasia of the endometrium despite massive doses of pelvic radiation. Epithelioma of the cervix had been demonstrated in 1944. At that time therapy consisted of the administration of 3,600 mg.-hr. of radium by tandem applicator (50 mg. for 72 hours). Several months later, for completion of therapy, intravaginally administered x-ray treatment with 4,800 r (800 r 6 times) was carried out. The patient was followed in the outpatient department of the hospital at intervals and apparently remained well about 29 months. At that time the patient again noted vaginal spotting. Cervicitis and adenomatous cystic hyperplasia of the endometrium were demonstrated. The patient was treated with external pelvic radiation of 3,600 r by alternating 300 r to the anterior and the posterior pelvis for 12 treatments. Four months later she was given 168 hours of radium with 2 no. 4, 1 no. 3, and 9 no. 2 needles. It is impossible to determine the exact dosage that this represented in milligram-hours of radium.

The appearance of the second primary tumor of the uterus 11 years after treatment of the original neoplasm prompts speculation on its origin. The higher incidence of carcinoma of the endometrium appearing years after the application of small doses of radiation to the pelvis is well recognized, but it is unlikely that the massive amount of radiation given in this case would act to stimulate the one remaining ovary to the production of excessive amounts of estrogens, this being the hypothesis usually advanced in explanation of the carcinogenic activity of smaller doses of radiation. Although there is apparently no common causal relationship between carcinoma of the cervix and endometrial hyperplasia, it is of further interest that these 2 conditions were demonstrated to be coexistent at the time of recurrence of cervical carcinoma. In spite of the high dose of local radiation at that time, the progression from adenomatous hyperplasia to carcinoma was not arrested. Radiation as a treatment for a adenomatous hyperplasia of the endometrium should be discouraged.

**Evaluation of a Systemic Treatment of Trichomonas Vaginalis.** A. Bocci. Minerva ginec. 9:727-731 (Sept. 15) 1957 (In Italian) [Turin, Italy].

Failure to effect permanent cure of infection with Trichomonas vaginalis may be the result of the protozoan being harbored in inaccessible sites, such as glands and urogenital tracts. An infected mate may reinfect his or her coital partner. The author presents his experience with 203 couples, of whom at least 1 partner had the infection of Trichomonas vaginalis. All men in the group were examined for infection of Trichomonas vaginalis. The patients received 2 courses of treatment, 1 of which was a 3-week premenstrual and the other was a 1-week postmenstrual course. Observed couples were divided into 6 groups, each 2 being subjected to a different regimen of treatment. Local vaginal treatment was given to 50 women, local vaginal and local urethral to 25 women, local urethral to 20 couples and local vaginal to the female partners. Oral treatment was given to 25 couples, oral to 47 couples and local vaginal to the female partners, oral and urethral to 36 couples and local vaginal to the female partners.

Local vaginal and urethral treatments included antiseptic substances with trichomonacidal properties and antibiotics. Subsequently, estrogenic hormones and biological products designed to reestablish the normal vaginal flora were given. Oral treatment included a daily dose of 60,000 units of an Italian proprietary trichomonacidal preparation (Trichomicina) and a daily dose of 300 mg. of Tritheon (2-acetyl-amino-5-nitrothiazole). Oral treatment alone produced the poorest results (6 cures—24%). Better results were obtained with local vaginal treatment alone (18 cures—36%) or in combination with local urethral treatment (9 cures—45%). Combination of oral and local vaginal and urethral medications gave the best results (25 cures —70%). The author concludes that, in view of the ability of the protozoa to survive outside the host's body, a simultaneous oral and local treatment of both coital partners is recommended.

## PEDIATRICS

**Concerning the Choice of Therapy for Childhood Hyperthyroidism.** M. B. Arnold, N. B. Talbot and O. Cope. Pediatrics 21:47-53 (Jan.) 1958 [Springfield, Ill.].

The authors report on 34 children with thyrotoxicosis, between less than 5 years and 15 years of age, who were similar concerning age of onset of symptoms and average duration of follow-up. Eighteen of these were subjected to subtotal thyroidectomy and were given thyroid substitution therapy with standard doses for 1 year. Nine of the 18 patients were found to be euthyroid and the other 9 to be hypothyroid at the close of this testing period. No treatment was given thereafter to the euthyroid patients. Thyroid, USP, in standard substitution doses was prescribed on a permanent basis for the hypothyroid patients. None of the patients suffered from paralysis of the recurrent laryngeal nerve or other significant operative complications, and none had a recurrence of the thyrotoxicosis. The 16 patients treated medically were given propylthiouracil for an average of 31 months. Eight of these had apparently permanent remissions after 16 to 57 months of treatment with propylthiouracil, and 4 were still in need of therapy

after 12, 16, 48, and 87 months of treatment respectively. Two of the remaining 4 were subjected to total thyroidectomy because of drug toxicity and 2 because of failure to follow directions. Six of the entire group had persistent goiter.

These data indicate that both methods of treatment are equally capable of eliminating the overt clinical manifestations of toxic diffuse goiter (Graves' disease) and that they yield about equal numbers of "cured" patients at the end of a 2-year period. Provided due care is taken, the risk of serious complications due to these forms of treatment also can be kept low. The surgical and medical regimens, however, appear to differ considerably in terms of their impact on the life of the patient and his family. The surgical method involves a brief preoperative period of detailed medical supervision, culminating in hospitalization for surgery with its slight but definite mortality risk. Thereafter, apart from possible need to take a dose of thyroid daily, the patient may be considered essentially normal. By contrast, the medical method requires that a medicament be administered to the patient about every 8 hours for a minimum of 2 years. One of these doses may of necessity have to be taken in the middle of the night at an hour when children are normally allowed to sleep undisturbed. Medical therapy also requires that the patient remain accessible to his physician for regulation of dosage and for prompt recognition of drug toxicity, which should be suspected every time the child has a sore throat or fever. These requirements of medical treatment may in themselves constitute a significant handicap to the child and his parents. This has to be taken into account in selecting the type of therapy to be recommended to each individual patient. It seems, however, that the acute stress of a carefully performed operation is less likely to injure the child as an individual than the prolonged incumbrances of chemotherapy.

**Determination of Some Streptococcal Antibody Titers and Acute Phase Reactants in Patients with Chorea.** T. N. Harris, S. Friedman and D. C. McLean. Pediatrics 21:13-21 (Jan.) 1958 [Springfield, Ill.].

Forty-three patients with chorea were subjected to 5 laboratory tests at the rheumatic fever research laboratory of the Children's Hospital of Philadelphia. Two of these tests were streptococcic serologic tests consisting of determinations of the antihemolysin-O (antistreptolysin) and antihyaluridase titers in the patients' serums, and the 3 other tests were short-term tests consisting of determinations of the erythrocyte sedimentation rate and of the concentrations of C-reactive protein and of mucoproteins in the patients' serums. Twenty-three of the 43 patients showed other major manifestations of rheumatic fever during the episode of chorea and could, therefore, be considered as rheumatics. None of the other major rheumatic manifestations of rheumatic fever had ever been observed in the remaining 20 patients who apparently had "pure" chorea.

The values of the 3 short-term tests were within normal limits in all or almost all the patients in whom chorea was not accompanied by other manifestations of rheumatic fever, whereas among those with such manifestations most of the values of the short-term tests were positive or above normal limits. The frequency distribution of titers of the 2 streptococcic antibodies observed in the serums of patients with rheumatic chorea was different from that observed in those of patients with "pure" chorea, the former having a higher center and range of distribution. The results of both the short-term tests and the streptococcic serologic tests also gave evidence of contamination of the "pure" chorea group with rheumatic patients. The data obtained in this study suggest, in agreement with those of several other observers, that the symptom complex of chorea can exist apart from the disease of rheumatic fever. The differential diagnosis between "pure" chorea and chorea which occurs as a manifestation of rheumatic fever is a matter of clinical judgment, and the laboratory aid toward the differential diagnosis may be applied in the same way as in other differential diagnoses involving rheumatic fever.

V 16
1958

**Hypertension and Hypercalcemic Nephropathy Due to Vitamin D Intoxication: A Case Report.** W. G. Way, D. L. Morgan and L. E. Sutton Jr. Pediatrics 21:59-69 (Jan.) 1958 [Springfield, Ill.].

The authors report a case of hypercalcemic nephropathy associated with hypertensive encephalopathy, secondary to vitamin D intoxication, in a 26-month-old girl. Before admission to the department of pediatrics of the Hospital of the Medical College of Virginia, the child was treated in another hospital for vitamin D-resistant rickets. Treatment had consisted of 170,000 I. U. of calciferol administered daily for 3 months. She had been immobilized in a spica cast, and her diet included about 1 qt. of milk daily. Anorexia, vomiting, polydipsia, flushing of the face, and progressive lethargy had been present for 11 days, and coma for 30 minutes before admission to the Medical College Hospital. Blood pressures were 160/120 mm. Hg in the upper extremities and 200/150 mm. Hg in the lower extremities. Left-sided clonic convulsions began, and the rectal temperature rose to 104 F (40 C). The seizures were controlled by phenobarbital sodium and open-drop ether. Acetylsalicylic acid, continuous sedation, parenterally administered fluids, and antibiotics were also given. By the second hospital day the temperature had

returned to normal, but there was sustained severe hypertension. For the first 6 days an attempt was made to control the hypertension with intramuscular and intravenous injections of magnesium sulfate. No side-effects were noted, but the drug soon lost its effectiveness. From the 7th to the 11th day the patient received cryptenamine (Unitensen) intravenously and intramuscularly, which was effective but had to be withdrawn because of uncontrollable vomiting. During the period from the 11th to the 14th day, in the course of which control of the blood pressure was achieved, the patient was given reserpine (Serpasil) and pentolinium (Ansolysen). During the period from the 15th to the 58th hospital day, in the course of which the blood pressure was gradually restored to normal, the hypotensive agents were withdrawn. Severe renal impairment was present on admission and regressed as the patient improved. The patient was followed at monthly intervals. Improvement was gradual, but she continued to be retarded mentally and physically. The blood pressure remained in the normotensive range.

The mechanism of vitamin D intoxication is not entirely clear. Hypercalcemia of vitamin D intoxication is considered to be the result of increased calcium absorption and decreased urinary and fecal excretion. Immobilization reduces osteoblastic activity, thus increasing resorption of bone, contributing further to elevation of the concentration of calcium in the serum. As a result of renal damage, there is a decreased glomerular filtration rate with further retention of nitrogen and phosphorus. Increased resorption of bone contributes also to hyperphosphatemia, although this is primarily due to decreased urinary excretion of phosphorus. The resultant hypercalcemia and hyperphosphatemia are conducive to metastatic calcification in and around the renal tubules. Measures to lower the concentration of calcium in the serum should be instituted. These include elimination of vitamin D and calcium from the diet. Little can be done to improve the renal insufficiency except to maintain adequate hydration and electrolyte balance. The combination of rauwolfia and pentolinium proved to be effective in this patient for controlling the hypertension. Prevention of vitamin D intoxication and its attendant complications, such as renal insufficiency, azotemia, and hypertension, rests with the judicious use of preparations containing vitamin D. If unusually large amounts are administered, the attending physician should be aware of the serious sequelae that may follow. Studies of renal function should be done at the onset of therapy, and these, along with determinations of calcium, phosphorus, and urea nitrogen in the blood, should be made at frequent intervals. Blood pressure and urinary excretion of calcium should be measured weekly.

**Response of the Young Infant to Poliomyelitis Vaccine Given Separately and Combined with Other Antigens.** R. Batson, A. Christie, B. Mazur and J. H. Barrick. Pediatrics 21:1-7 (Jan.) 1958 [Springfield, Ill.].

Two groups of infants, each consisting of 50 babies, received poliomyelitis immunization courses. The infants in the first group received 1 cc. of poliomyelitis vaccine at the ages of 6 weeks, 12 weeks, and 10 months or 3 injections at intervals of 6 weeks and 7 months. The infants in the second group were given poliomyelitis vaccine according to the same schedule as those in group 1, with the only exception that the first dose of the poliomyelitis vaccine was administered in the same syringe with pertussis and smallpox vaccines, and the second and third doses of poliomyelitis vaccine were given in the same syringe with diphtheria-pertussis-tetanus toxoid. The right lower extremity was used for the intramuscular injection of poliomyelitis vaccine. Blood was collected at the time of each injection of poliomyelitis vaccine and also 2 weeks and 4 or more months after the third or "booster" injection; thus, each infant had 5 collections of blood for antibody determinations uniformly obtained from the internal jugular vein.

Poliomyelitis vaccine administered to 6-week-old infants resulted in a satisfactory antibody response. The response to poliomyelitis vaccine mixed with pertussis and diphtheria-pertussis-tetanus toxoid and given as 1 injection was satisfactory. The combination of antigens gave no practical interference with the development of antibodies to diphtheria and pertussis. There were no apparent hazards or adverse reactions associated with combined poliomyelitis-pertussis or poliomyelitis-diphtheria-pertusis-tetanus vaccines. There were no differences in poliomyelitis antibody response after immunizations with separate and combined vaccine injections. The existence of maternal antibodies at the time of poliomyelitis immunization had no apparent influence on the production or persistence of active antibodies. These findings indicate that poliomyelitis immunization procedures can easily be integrated into routine pediatric immunization programs, thereby affording the earliest possible protection.

## THERAPEUTICS

**An Appraisal of the Present Treatment of Barbiturate Poisoning.** L. C. Jenkins and H. B. Graves. Canad. Anaesthet. Soc. J. 5:41-54 (Jan.) 1958 [Toronto, Canada].

Moderately severe poisoning usually occurs when 5 to 10 times the full oral hypnotic dose of barbiturate has been ingested. The fatal dose varies with many factors and cannot be stated with cer-

tainty, but when over 15 to 20 times the ordinary hypnotic dose has been absorbed, severe poisoning will ensue and even expert therapy may fail to save the patient's life. The major action of the barbiturates is depression of the central nervous system. The untoward effects on the cardiovascular system observed in acute barbiturate poisoning are to some extent secondary to hypoxia due to respiratory depression. Experimentally, very large doses have been shown to produce cardiac irregularities and even cardiac failure in heart-lung preparations. The medullary respiratory center is depressed directly, and breathing becomes slow and shallow. This is the major danger in acute barbiturate intoxication.

There is a general tendency to overtreat the patient poisoned by central nervous system depressants. In cases of mild to moderate intoxication, little therapy other than supportive measures may be required. The present-day controversy centers on the use of central analeptics of which picrotoxin and metrazol are most commonly employed either separately or conjointly. Their use is not without dangers. They are not always effective in severe barbiturate poisoning. The consensus is that sodium succinate is not useful in acute barbiturate poisoning. Recently, nonconvulsive electrostimulation has been advocated, but it has yet to be confirmed in patients as being beneficial in acute barbiturate poisoning. Two major recent advances in the treatment of acute barbiturate poisoning are as follows: 1. The use of bemegride (Megimide) and amiphenazole hydrochloride, 2-4-diamino-5-phenylthiazole (Daptazole), as chemical antidotes. Initially, they were believed to be true chemical antagonists to barbiturates on the basis of their structural similarity. It now appears that they are central analeptics but with a high specificity for the barbiturates. They are not ideal, since toxicity occurs with overdosage. 2. Hemodialysis. This has shown encouraging results in the treatment of severe barbiturate poisoning. Unfortunately, it is a rather complex technique.

## PATHOLOGY

**Carcinoma in Situ of the Stomach.** J. J. Bocian and A. E. Geschke. A. M. A. Arch. Path. 65:6-11 (Jan.) 1958 [Chicago].

A 52-year-old Armenian woman complained of vague intermittent epigastric discomfort of 2 years' duration. The patient had undergone cholecystectomy in 1931 and subtotal thyroidectomy for an adenomatous goiter in 1956. Examination revealed a fairly well-developed and well-nourished patient in no discomfort at the time of examination, in whom 8 degrees of HCl (hydrochloric acid) was obtained only an hour after histamine injection. A fluoroscopic and roentgenographic examination of the upper gastrointestinal tract gave the impression of a change in the outline along the distal portion of the greater curvature of the stomach and suggested a moderate elevation of the mucosa. An exploratory laparotomy revealed extremely dense and extensive adhesions presumably due to the previous cholecystectomy. An exploratory gastrostomy was done in the absence of any palpable abnormalities of the area. A biopsy specimen from the area designated as having a change in outline revealed markedly hyperplastic gastric mucosa to the point of its having intestinalized. It formed atypical glandular cystic cavities. There were many mitoses, many of which were abnormal. The cells lining the glands were hyperchromatic, showing a definite loss of polarity. Nuclei different in size, shape, and staining qualities were found at all levels of the cells. The transition between normal and abnormal glands was abrupt, and multiple serial sectioning and serial block examination failed to reveal any evidence of submucosal extension. Since neither the extent of the tumor nor the possibility of multiple tumors could be ascertained, a high subtotal gastrectomy was done with the resection of five-sixths of the stomach, omentum, and subpyloric nodes. In view of the fact that carcinoma in situ, in general, presents a normal gross appearance, it is suggested that biopsy specimens be taken from those stomachs where negative findings prevail in an effort to increase the detection of early carcinoma and to subsequently reduce the rate of mortality from cancer of the stomach, which now numbers 25,000 to 40,000 per year in the United States.

**Moniliasis: Review.** A. Stenderup. Tidsskr. norske lægefor. 77:939-944 (Nov. 1) 1957 (In Danish) [Oslo].

In recent years fungus infections, especially moniliasis, have become more frequent. The infections occur particularly in patients during chemotherapy, and chemotherapeutics are by most authors believed to play a part in their origin. The mechanism of the origin is not clear. Many of the cases reported are systemic infections, usually grave. Proliferation of fungi often takes place during treatment, especially with broad spectrum antibiotics, and an increased number of fungi in the organism can reasonably be assumed to increase the possibility of clinical infection due to the fungi. Other factors must also be active. Vitamin $B_2$ deficiency may be significant. The diagnosis of moniliasis cannot always be based on the fungi findings alone. The value of a number of substances being tested for the treatment of moniliasis is not yet demonstrable.

V 16
1958

**Moniliasis: Clinical Material.** A. Stenderup and E. Beeken. Tidsskr. norske lægefor. 77:944-946 (Nov. 1) 1957 (In Danish) [Oslo].

The pathogenesis in moniliasis is not known. It does not always follow that with proliferation of Candida albicans in the mucous membranes of the organism the fungi become rooted in the tissues. The vitamin balance in the organism, particularly the vitamin B balance, may perhaps play a part, but it is probably not the only factor. Fifty-two patients in whom Candida albicans was found in large numbers had clinically demonstrable moniliasis. Thirty-two of the patients had Hodgkin's disease, leukemia, or cancer. Most of them were in poor general condition and had been treated with antibacterial or antineoplastic chemotherapeutics, roentgentherapy, or ACTH and cortisone.

**Local Cures Obtained in Patients with Cavities Which Remained Open after Prolonged Chemotherapy; Definite and Possible Cures: Study of 114 Anatomically Confirmed Cases.** P. Renault and E. Bernard. Rev. tuberc. 21:893-916 (Sept.-Oct.) 1957 (In French) [Paris].

The authors studied 935 surgical specimens obtained from patients with pulmonary tuberculosis for which they had been treated preoperatively with 2 or 3 antibacterial drugs, isoniazid serving as the medicamentous axis. Of 615 specimens which contained open cavitary lesions at some time in the course of the patient's disease, 101 with compact caseous or fibrous residues were excluded. The remaining 414 specimens contained open cavitary lesions at the time of the surgical intervention. Three hundred of these contained cavities the caseous walls of which were still the seat of active tuberculous infection, 65 (18%) contained cicatricial cavities, and the remaining 49 contained completely cleansed but not healed cavities. Of the 65 specimens 3 were observed in 1953, 11 in 1954, 24 in 1955, and 27 in 1956. The incidence of local cures, among the cavities which had remained open thus showed a progressive increase from year to year. In most of the specimens with cicatricial cavities, healing of the cavities was associated with a total or subtotal cure of all the other tuberculous foci present in the lung. Of the 49 completely cleansed but not healed cavities, 18 showed partial cicatrization and some of these approached the stage of complete cicatrization, 31 did not show any parietal cicatrization but showed simple cleansing; most of these seemed to be still virulent tuberculous foci, the significance of which remained vague.

A study of the clinical and bacteriological circumstances of the healing process was carried out with 62 of the 65 specimens with cicatricial cavities. In 29 of the 62 cases prolonged antibacterial treatment had been practiced for recent lesions; in 24 cases this treatment had been applied to old lesions or to lesions which recurred after collapse therapy or after a first course of chemotherapy. In the remaining 9 cases these circumstances were not known. The duration of antibacterial treatment was 6 months to 1 year in 30 cases, more than 1 year in 25, and not known in 7. The chest roentgenogram findings concerning these cavities were not significant except for the fact that in only 8 of the 62 cases the roentgenologic appearance was that of a progressive thinning of the shadow of the cavitary wall which may or may not be associated with an increase of volume, an enlargement of the cavity. The sputums had become negative for more than 6 months before the surgical intervention in 41 cases, and tubercle bacilli had been observed regularly in 2 up to the time of the surgical intervention. These findings suggest that clinical diagnosis of "open healing" of the tuberculous activities is always associated with an appreciable risk, and many of the cicatricial cavities may not be detected by the present means of exploration. In the light of these facts, the indications for the present methods of surgical treatment deserve certain revision, but workers should be cautioned against a systematic change in therapeutic attitude which would not be justified by the presently available means of diagnosis.

**Pathological Morphologic Changes of the Heart in Poliomyelitis.** E. K. Zhukova. Arkh. pat. 19:15-25 (No. 11) 1957 (In Russian) [Moscow].

A detailed histological study of the heart was carried out in 18 lethal cases of acute poliomyelitis. Interstitial myocarditis was revealed in 2 cases. Circulatory disturbances, perivascular and interstitial edema, proliferation of the cellular elements of the stroma, and slight dystrophic changes in the muscle fibers of various degrees were noted in the other 16 cases. The author does not consider these changes in the myocardium to be due to myocarditis in the clinicoanatomical sense, since they may be frequently found in various infectious toxic diseases without the corresponding clinical manifestations. Not a single case of endocarditis or pericarditis was noted. Various degrees and diffuse dystrophic changes of the nerve cells were demonstrated in the nervous system. These changes ranged from mild (in the form of a swelling) to grave (pyknosis and "shade" cells). The system of transmission of the nerve impulse in the heart was not affected.

**Complications in Antirabic Vaccination.** Ts. B. Khaime and V. S. Schnirova. Arkh. pat. 19:69-77 (No. 11) 1957 (In Russian) [Moscow].

Five instances of complications after antirabic vaccinations are reported. Two patients had neuroparalytic complications. Both patients recovered.

In 2 patients shock appeared after the 13th injection of the vaccine. In 1 of these shock was complicated by grave brain involvement with oculomotor and bulbar disturbances. The patient died on the 3rd day. Autopsy revealed foci of red softening in the cerebral hemispheres and in the vermis cerebelli with hemorrhage into the 4th ventricle. Profuse hemorrhages were found in the skin of the head, the body and the extremities. Microscopically, hemorrhagic necrosis with resorption and beginning organization were found in the pons varoli and in the cortex of the cerebral hemispheres. Small foci of demyelinization were demonstrable in the optic tract and in the white matter of the cerebellar hemispheres. The 5th patient had an acute condition with the initial symptoms of affection of the central and peripheral nervous systems, such as headache and paraesthesia of the extremities. Personal experience and data from literature show the possibility of combination of various complications in the same patient. This supports the conception of a single etiology in different types of complications developing after vaccination. Probably this single etiological factor is the proteins of the brain substance of rabbits. The disease appears as a result of allergic reaction of the organism to repeated introduction of foreign proteins. A special reactivity of the organism evidently plays an important part.

**A Study of the Relationship Between Sickling and Hookworms.** G. F. Jacob. East African M. J. 34:597-600 (Nov.) 1957 [Nairobi].

It is now well established that the possession of the sickle cell trait confers some degree of protection against the more severe effects of falciparum malaria. The hookworm is a blood-feeding parasite and is of widespread distribution throughout the tropics; its geographical range is broadly comparable to that of malaria. Since high sickling rates occur where falciparum malaria is endemic, it must also be true that high sickling rates will be found in areas where hookworm rates are high. The relationship between the sickling trait and hookworm infestation had been studied by Beet in 1946, with the result that 50% of 102 patients with sickling and 52% of 149 patients without were found to be infested with hookworm. This report is concerned with studies carried out in a village of 300 people. The blood was investigated for sickling and for the hemoglobin content, and the stools were examined for hookworms and occult blood. There was no difference in hookworm infestation rates between those with the sickling trait and those without this trait. The mean hemoglobin values were slightly lower in those without the sickling trait. No diminution in the effects of hookworm infestation in persons with the sickling trait has been demonstrated in this series. It is possible that the lowered hemoglobin values in the persons without the sickling trait would reach the level of statistical significance if the series were larger, but even if malaria were then excluded and the difference were proved to be related to hookworms, it is so small an effect as to be of no practical significance.

## RADIOLOGY

**Radiation Treatment of Cancer of the Thoracic Oesophagus.** L. M. Gol'dshtein. Probl. Onc. 3:311-320 (No. 3) 1957 [New York].

The author reports on 119 patients with cancer of the esophagus who were given irradiation treatment at the radiologic department of the Institute of Oncology in Leningrad, U.S.S.R., between 1947 and 1956. The presence of a tumor was established by radiologic examination. Esophagoscopy supplemented by biopsy was performed in patients in whom there was doubt as to the correctness of the diagnosis. The cervical portion of the esophagus was the site of the tumor in 12 patients, the upper two-thirds of the thoracic part of the esophagus in 102, and the lower thoracic part in 5. The essential features of the irradiation therapy employed was prolonged, fractional, low-intensity radiation of the tumor with roentgen rays through a lead grid from 2 and, less frequently, from 3 skin fields, measuring 6 by 8 or 6 by 10 cm., directly onto the tumor. The technical factors were 180-200 kv. and 1-2 mm. copper filtration at a skin focus distance of 50 to 60 cm. The half-value layer was 1.4-1.7 mm. copper. The minute strength of a dose at the surface of the skin field used under the lead grid was 5-10 r. The tumor was radiated daily from 2 fields. The individual dose to the tumor focus was then 100-150 r. The total duration of treatment was 6-8 weeks, in the course of which the tumor was given a total radiation dosage of 4,000-7,000 r.

Sixty-nine (67.7%) of the 102 patients with cancer of the thoracic part of the esophagus showed definite subjective and objective improvement in varying degree, manifested by improvement in the general condition, increase in weight, disappearance of pain and dysphagic symptoms, and increased patency of the esophagus. Radiologic examination of the esophagus revealed a marked reduction in the size or sometimes even complete disappearance of irradiated tumor. Signs of radiation sickness were absent in most of the patients, and the vitally important organs, through which in other irradiation methods x-rays from many fields are directed on the tumor, were not subjected to excessive irradiation. In 2 patients who died after irradiation treatment of remote metastases, the complete absence of the primary tumor from the irradiated area was confirmed by microscopic examination. In 1 patient who died of cerebral hemorrhage and who had remained in good health for 3 years and

V 16
1958

8 months after irradiation treatment for cancer of the esophagus, autopsy revealed aggregations of cancer cells at several points in the smooth cicatrized esophageal wall. In view of these and other similar observations, a second (antirecurrence) course of irradiation treatment should be given 3-5 months after the successful original course of treatment in order to consolidate the results. Of the 102 patients with cancer of the upper two-thirds of the thoracic esophagus, 76 (74.4%) survived for less than 1 year, 19 (18.7%) for 1 to 2 years, 4 (3.9%) for 2 to 3 years, and 3 (2.8%) for 3 to 5 years. Of 130 patients not submitted to irradiation therapy, only 7 (5.4%) lived for more than 1 year, while 26 (25.4%) of the 102 patients submitted to irradiation therapy survived longer than this period. Although only 3 (2.8%) of the 102 patients were alive and in good health 3 years after the irradiation treatment, the temporary relief of suffering and amelioration of the conditions of their existence in most patients subjected to this treatment is as important as attempts, not by any means always effective, in radical treatment of some individual patients by surgical methods. The author suggests that for elderly patients with cancer in the thoracic part of the esophagus in whom the risk of surgical intervention is unusually great and the chances of lasting cure extremely uncertain, irradiation methods are preferable to surgical methods of treatment.

**Retrograde Aortography by Percutaneous Femoral Artery Catheterization.** P. Bétoulières, M. Pelissier and R. Mimran. Press. méd. 65:2159-2162 (Dec. 25) 1957 (In French) [Paris].

Retrograde aortography by percutaneous catheterization of the femoral artery was performed by the authors for contrast studies of all the segments of the aorta, as well as of certain collateral vessels, particularly the vertebral artery, the subclavian arteries, and the carotid arteries. The catheter was passed even into the left ventricle in order to obtain an intracavitary roentgenogram of the left side of the heart. The equipment used was the same as that employed by Seldinger, consisting of a puncture needle, a flexible metal guide, and a polyethylene catheter of the same gauge as the needle. After puncture, the needle was replaced by the catheter with the help of a guide, thus preventing arterial trauma. Since compounds rich in iodine are quite viscid, the authors prefer the use of substances of moderate concentration as contrast mediums, such as diluted Radioselectan, a proprietary aqueous solution containing sodium and methylglucamine salts of diatrizoate. With this technique, the method has elective indications for which it appears to be irreplaceable. It is definitely harmless and is readily performed. Its possibilities in the field of vascular exploration are great, since it provides visualization of the major arterial circulation from the sigmoid region to the distal vascular ramifications in the extremities, the body trunk, and the head and neck region. As it requires only a small amount of contrast medium, the examination may be repeated several times to vary the incidence of the rays with the patient in different positions, since he can be moved without risk once the catheter has been fixed in situ. Although retrograde aortography by catheterization of the femoral artery does not tend to replace systematically the other methods of aortography, namely, direct thoracic aortography, counter-current retrograde aortography, and translumbar abdominal aortography, it may be a useful substitute for these methods in certain cases. It should, therefore, be considered as a complementary technique of great value.

## PUBLIC HEALTH

**Clinical and Experimental Findings on the Correlation Between Dental Caries and Metabolism of the Thyroid Gland and Fluorine.** O. Tempestini. Minerva stomatol. 6:287-292 (Nov.) 1957 (In Italian) [Turin, Italy].

Dental caries experiments on rats, performed in the author's clinic, have shown that addition of desiccated thyroid to the diet has the same effect in prevention of dental caries as 20 μg of fluorine per liter of drinking water. A survey of 11 towns in the provinces of Calabria and Sicily revealed a distinct correlation between the fluorine content of drinking water and dental caries in children 11 to 15 years of age. The higher the fluorine content of drinking water, the lower was the incidence of dental caries, and conversely. In 2 other towns, where more than a half of the population had goiter, the correlation between the incidence of fluorosis or dental caries and fluorine content of drinking water did not follow the expected clinical pattern. In 1 town fluorosis was endemic despite the low fluorine content of drinking water, whereas fluorosis was absent in the other town, where a low fluorine content of drinking water was found. A higher incidence of dental caries was observed in these 2 towns than in the others where there was no incidence of goiter. Caries was more severe in children between the ages of 11 to 15 years than in those aged between 6 and 10 years. The author concludes that hypothyroidism both predisposes to the incidence of dental caries and partially inhibits the fluorine action of preventing dental caries in young persons during the period of dental formation. The indiscriminate fluoridation of public water supply for prevention of dental caries may produce fluorosis and undesirable side-effects in persons with deficiency of thyroid activity, without affording benefit for the prevention of dental caries.

# BOOK REVIEWS

**Orthopedics for the General Practitioner.** By William E. Kenney, M.D., Orthopedic Surgeon, Truesdale Hospital, Fall River, Mass., and Carroll B. Larson, M.D., F.A.C.S., Professor of Orthopedic Surgery and Chairman of Department of Orthopedic Surgery, State University of Iowa, Iowa City. Cloth. $11.50. Pp. 413, with 180 illustrations. C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1957.

The authors of this reference book explain in their preface that the public expects a great deal of the general practitioner from the standpoint of knowledge of everything medical or surgical. This book is intended to help him evaluate his orthopedic problems and to treat those that come within his capabilities. Both authors understand the problems experienced by general practitioners and what they need in order to help them to render good care to their patients. The first section deals with the orthopedic diseases and infections of childhood. The subject matter is subdivided according to the anatomic location of the complaint or condition under discussion. Orthopedic problems of the adult are well outlined. The recommended treatment is usually practical and easy to carry out. The last two chapters deal with arthritis and bone tumors. These chapters should be of great help to the general practitioner who has puzzled over some obscure lesion and must decide whether or not he shall undertake the treatment himself or refer the patient to a specialist. This book should be of help to most general practitioners.

**An Introduction to Functional Anatomy.** By David Sinclair, M.A., M.D., Professor of Anatomy, University of Western Australia, Perth, Australia. Cloth. $8.50. Pp. 426, with 166 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1957.

This book is intended primarily for training courses in paramedical sciences, especially for occupational therapists and physiotherapists. Its major premise is embodied in the statement in the preface that physiotherapists and occupational therapists must have a knowledge of the locomotor system much in excess of that required by most nurses. Hence, the author made choices in topics and in the extent of treatment which overwhelmingly favor the skeletal, muscular, and nervous systems. He is inclined to allow such ancillary specialists merely a nodding acquaintance with other organ systems. Such a deliberately unbalanced presentation limits the usefulness of the book in other fields. The best features of this text reside in its pleasant style and in the emphasis on the functional aspects of some organ systems and of the body organization as a whole.

This is not old-fashioned, dull anatomy cut down to the barest requirements of college courses. Color is added, now and then, by an English turn of phrase, such as "a desire for elevenses or afternoon tea" (on blood sugar levels), the "breakdown of roast mutton" (on protein metabolism), and "to make bricks without straw" (on simple goiter, also called "Derbyshire neck"). One might question the less favorable features pertaining to the highly summarized treatment of fairly complex anatomic and particularly physiological and biochemical conditions of the human body. A compendium-like treatment may favor memorization rather than the learning of basic facts, which a beginner must understand before a summary can really be meaningful. About one-half of the book is devoted to tissues and systems, with a space allotment for the nervous system of four or five to one compared with muscle or the circulatory system and blood. Epithelium and connective tissue are given only the most cursory treatment, and the descriptions of the digestive, genitourinary, and endocrine systems are kept within only a few pages. In the second half there are brief chapters on metabolism, posture, and muscular activity. A major chapter on topographical anatomy again stresses the somatic motor apparatus, especially of the upper and lower limbs. The book has an interesting glossary of 15 pages, explaining Greek and Latin terms, and a good index. A few other English texts are mentioned for collateral reading.

**Hemophilia and Hemophilioid Diseases: International Symposium.** Editor: Kenneth M. Brinkhous, M.D., Professor of Pathology, University of North Carolina, Chapel Hill. Symposium sponsored by National Hemophilia Foundation and held at Ambassador Hotel, New York City, August 24-25, 1956. Publication of book was aided by grant through National Hemophilia Foundation from Gustavus and Louise Pfeiffer Research Foundation. Cloth. $7.50. Pp. 265, with illustrations. University of North Carolina Press, Chapel Hill, 1957.

The first section of this book deals with the clotting defect in hemophilia. The antihemophilic factor, the isolation and assay of antihemophilic globulin, and standardization of so-called antihemophilic fractions are discussed by American, Swiss, and French authors respectively. Then follow four papers on inhibitors and hemophilia, specifically on the role of certain plasma factors and anticoagulants. Contrary to claims made previously,

These book reviews have been prepared by competent authorities but do not represent the opinions of any medical or other organization unless specifically so stated.

V 16
1958

antibodies against clotting factors could not be demonstrated by Pennalver and associates. Deficiency of hemostasis and of platelets are the subject of the two concluding papers of section 1. Parahemophilia, proconvertin deficiency, plasma thromboplastin component deficiency, plasma thromboplastin antecedent deficiency, and the so-called Hageman trait are discussed in section 2. Five papers deal with genetic and marriage problems, three with problems of diagnosis, and four with management in sections 3, 4, and 5. A beautifully illustrated paper on the pathology of hemarthrosis in hemophiliac dogs and papers on bone and joint complications, management and orthopedic rehabilitation, and psychiatric and medicosocial aspects are contained in the two final sections. The international composition of the original papers and of the discussions which follow each section makes the presentations highly diversified and stimulating. One gets a clear picture of the current knowledge and of the limitations in our understanding of this complex subject. The frontispiece portrait of John C. Otto, the Philadelphia physician who is given the credit for the first description of hemophilia, suggests that historically minded readers might have appreciated a direct discussion of the exciting history of this puzzling disease. Those responsible for the organization of this symposium and for making the proceedings generally available deserve commendation. The book will be found indispensable by students of hemophilia and valuable by physicians in general.

**Morphologie und Physiologie des Nervensystems.** Von Prof. Dr. med. et phil. Paul Glees, M.A. Cloth. 58 marks; $13.80. Pp. 445, with 149 illustrations. Georg Thieme Verlag, Herdweg 63, (14a) Stuttgart N, West Germany; [Intercontinental Medical Book Corporation, 381 Fourth Ave., New York 16], 1957.

The author attempts to present the morphology and physiology of the nervous system in a book of 445 pages, of which 50 pages are used for references, 25 for the index, and a large part for the excellent figures and diagrams. It is, therefore, not surprising that the author is unable to give a reasonably complete account of neurophysiology. For instance, the chapter on the autonomic nervous system comprises 4 pages. The classic work of Magnus on postural and righting reflexes and the significance of the medulla oblongata for respiratory and autonomic functions are not mentioned. Frequently, newer results are discussed in detail, but the earlier fundamental work necessary for the understanding and evaluation of more recent data is not presented. Thus the chapter on nervous conduction deals with the theory of saltatory conduction but fails to mention the all-or-none principle. The book will be valuable for the German reader because it includes a good deal of the recent Anglo-American literature. The author is more familiar with anatomic than with physiological work. The description of the anatomic methods of experimental neurology and the anatomic considerations (often including comparative anatomy and neurology) are valuable. Because of many omissions the book is not recommended to the beginner, but the expert may read it with profit. The illustrations, binding, and printing are excellent.

**Gynecologic and Obstetric Pathology, with Clinical and Endocrine Relations.** By Emil Novak, A.B., M.D., D.Sc., and Edmund R. Novak, A.B., M.D., Assistant Professor of Gynecology, Johns Hopkins Medical School, Baltimore. Fourth edition. Cloth. $14. Pp. 650, with 683 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, England, 1958.

The fourth edition of Novak's world famous book on gynecologic and obstetric pathology has lost nothing by the sad death of Emil Novak. As Edmund Novak says in the preface, he and Donald Woodruff worked so closely with Emil Novak that they could predict his reactions to various concepts, trends of thought, and articles by various authors. This edition is 55 pages longer and contains 33 more illustrations than the previous one. In it there is amplification of such important pathological problems as the relationship of basal cell hyperactivity to intraepithelial cancer and endometrial hyperplasia to adenocarcinoma and genital tuberculosis. R. E. L. Nesbitt completely rewrote the chapters on implantation and placentation and abnormalities of the placenta and appendages other than hydatidiform mole and chorionepithelioma, and John K. Frost prepared an outstanding chapter on gynecologic and obstetric exfoliative cytopathology. The bibliography has been brought up to date, and many old illustrations have been replaced by better ones. The book is well printed, and, as with all of Emil Novak's publications, the text is most interesting to read. This edition should remain a classic in its field.

**Thromboelastography.** By Pietro de Nicola, Associate Professor, Department of Medicine, University of Pavia, Italy. Publication number 316, American Lecture Series, monograph in American Lectures in Pharmacology. Edited by Chauncey D. Leake, Ph.D. Cloth. $5.50. Pp. 110, with 85 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1957.

Thromboelastography, a process for recording graphically the clotting of blood or recalcified plasma, was introduced in 1948 by H. Hartert in Germany. Since then numerous references have appeared in medical journals. In this timely monograph the author explains in simple terms how the thromboelastograph is made and its clinical significance. Fundamentally, the curve is recorded photographically from the retardation of a plunger in a vial of blood which is rotated back and forth.

Initially, there is a straight line, but, as the blood clots, this divides into two lines. The resulting graph varies with different diseases, as well as with different medicaments and reagents. The three components, reaction time, clot formation time, and maximum amplitude can be measured and plotted graphically. Numerous thromboelastographs are given in the book, with the curves that can be plotted from them. The data are clearly presented, and the monograph should be valuable as a help in understanding published figures and references to thromboelastography.

**Fundamentals of Electrocardiography and Vectorcardiography.** By Lawrence E. Lamb, M.D., Director of Cardiology and Chief, Department of Internal Medicine, Air University, School of Aviation Medicine, USAF, Randolph Air Force Base, Texas. Cloth. $9.50. Pp. 142, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1957.

Although methods of teaching electrocardiography vary widely, there is an increasing tendency to present the fundamentals of electrocardiography and vectorcardiography in one package, as has been done in this book. Starting with the basic electrical behavior in cells, the subject matter is gradually developed through electrical events in the normal heart and the changes occurring with disease. In adhering to fundamental concepts, the author has given scant attention to clinical electrocardiography. For instance, only eight pages are devoted to myocardial infarction. The text is concise, being at times almost in outline form. Some amplification in certain areas would make for easier reading. This book may be of some help to students receiving their first introduction to electrocardiography. It may also be of value to the cardiologist who would like to brush up on the fundamentals of electrocardiography, but it cannot be used as a reference for clinical electrocardiography.

**Chemotherapy and the Central Nervous System.** By Henry McIlwain, Ph.D., D.Sc., Professor of Biochemistry, University of London at Institute of Psychiatry (British Postgraduate Medical Federation), London. Cloth. $10. Pp. 328, with 61 illustrations. Little, Brown & Company, 34 Beacon St., Boston 6; J. & A. Churchill, Ltd., 104 Gloucester Place, Portman Sq., London, W.1, England, 1957.

In this age of esoteric scientific literature, it is most satisfying to read a work that deals not only with the author's particular investigations but also relates them to investigations in allied disciplines, providing a sense of perspective for the reader. The book has two main themes: the development of principles and methods of chemotherapy and the application of chemotherapy in the treatment of mental disorders. The opening chapters discuss the early attempts to apply synthetic organic chemistry to the treatment of disease, particularly diseases involving the brain. These chapters include general depressants, control of body temperature, and the action of drugs on the body and disturbing agent. There is much material on infection and the central nervous system describing the triumphs achieved by the synthesis of specific chemical agents designed to damage the infecting parasite. The discovery and application of sulfonamides and antibiotics and the new principles they brought to chemotherapy are discussed separately under metabolic and biological antagonisms. Additional chapters are concerned with epilepsy and the anticonvulsant drugs and the analgesics. Other specific nervous and mental disorders and the excitant and depressant drugs used in their treatment are also considered. The final chapter relates three subjects concerned with the development of therapeutically active chemical substances: chemotherapy and the central nervous system, common factors in the synthesis of new drugs and relationships between synthetic drugs and biologically active compounds of natural origin.

**The Anatomy of Congenital Pulmonary Stenosis.** By Sir Russell Brock, M.S., F.R.C.S., F.A.C.S., Thoracic Surgeon to Guy's Hospital, London. Cloth. $7.50. Pp. 114, with 77 illustrations. Paul B. Hoeber, Inc. (medical book department of Harper & Brothers), 49 E. 33rd St., New York 16, 1957.

V 16
1958

This well-written monograph covers in great detail what has been learned about congenital pulmonary stenosis by many investigators and especially by the author. The embryological development of the heart, always a difficult subject to present, is concisely covered and suitably illustrated. The most important features of this treatise are the descriptions of the various kinds of pulmonary stenosis and associated anomalies. Much emphasis is placed on the mechanics of the right ventricle in infundibular stenosis and on the importance of studying the lesions during life rather than at postmortem examination "when the heart is inert, rigid, contracted, and often hardened by fixation." The author gives a detailed account of the lesions in Fallot's tetralogy as he has found them in 168 patients who have undergone infundibulectomy, an operation that he perfected. This fine book should be a welcome addition to the library of those who are interested in this phase of congenital heart disease.

**Introduction to Clinical Endocrinology.** By A. Stuart Mason, M.A., M.D., B.Ch., Senior Lecturer, Medical Unit, London Hospital, London. Cloth. $4.50. Pp. 192. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1957.

The original purpose of this brief textbook was to present the subject of clinical endocrinology in terms of applied physiology. In actuality, however,

it is rather a brief review of endocrinological disorders with only scant consideration of the underlying physiological principles. As a consequence, it fulfills neither the needs for a detailed practical text nor those of a theoretical treatise. Although the book is well written in an excellent style, the absence of any illustrations or references detract from its value. The subject matter is, in general, soundly presented but not completely up to date. For example, no mention is made of the Thorn test for adrenal insufficiency, the phosphate excretion test for the presence of a parathyroid tumor, enzymatic deficiency as a cause of cretinism, or the important manifestations of toxic adenoma of the thyroid. Despite these criticisms, the present volume should serve as a good review of the subject for anyone requiring a brief resume of clinical endocrinology, including the diagnostic and therapeutic aspects of the subject.

**Clinical Orthopaedics. Number Ten, Fall, 1957.** Anthony F. DePalma, editor-in-chief. With assistance of asssociate editors, Board of Advisory Editors and Board of Corresponding Editors. Cloth. $7.50. Pp. 367, with illustrations. J. B. Lippincott Company, 227-231 S. Sixth St., Philadelphia 5; 2083 Guy St., Montreal, Canada; Pitman Medical Publishing Company, Ltd., 45 New Oxford St., London, W.C.1, England, 1957.

In format and general appearance, this book matches the previous ones of this series. Its first portion is an eloquent tribute to the late Dr. Dallas B. Phemister. The second section deals with affections of growth centers, and each chapter within this section deals primarily with specific epiphysial lesions. Throughout this section the x-ray reproductions, in general, are not as good as in previous volumes, and the editors should insist on better roentgenographic reproductions. There are some mildly controversial statements, but these should stimulate the readers to further investigation. The next section is a continuation of the symposium on pathologic physiology of metabolic bone disorders; the first portion appeared in volume 9. This symposium is rather complete, and the bibliography is extensive. The last section considers general orthopedic problems. Most of these are well presented. In general, this volume maintains the high standards that have been set by this publication.

**Surgery of the Biliary Tract, Pancreas & Spleen.** By Charles B. Puestow, M.D., Ph.D., Clinical Professor of Surgery, College of Medicine and Graduate College, University of Illinois, Chicago. A Handbook of Operative Surgery. Second edition. Cloth. $9.75. Pp. 381, with 72 illustration by Jessie W. Phillips. Year Book Publishers, Inc., 200 E. Illinois St., Chicago 11, 1957.

This is one of six handbooks of operative surgery, all with a similar format. Each chapter begins with a brief discussion of the problem considered, followed by verbal and pictorial descriptions of operative techniques. The concise verbal presentation is always on the page opposite the diagram depicting the steps of the operation. The first edition, published in 1953, was a valuable contribution to the literature on operative technique and was well received. The new edition constitutes more of a second printing than a second edition, for 95% of the original book is reprinted verbatim. The only section which has undergone significant revision is the chapter on indications and contraindications for splenectomy. A brief discusssion of intravenous cholangiography has been added, and one new operative procedure, caudal pancreaticojejunostomy, is described. This book is highly recommended to those not familiar with the first edition.

**Principles of Ophthalmoscopy.** By John K. Erbaugh, M.D. Cloth. $5.50. Pp. 69, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1958.

This monograph is a practical, simplified, yet accurate description of the findings and changes in the ocular fundus in health and in disease. It is intended primarily for the general practitioner, the internist, and the student of ophthalmology. It also serves to reemphasize and reclarify the funduscopic picture seen daily by the practicing ophthalmologist. The description of the sizes of normal disks and color, physiological depression, and true analysis of retinopathies are all reevaluated for him. The student should find it of tremendous benefit in understanding the principles of ophthalmoscopy and the use of the ophthalmoscope. The text is readable and well sprinkled with colored photographs, diagrams, and fundus pictures. It should be a welcome addition in the library of any student of ophthalmology, internist, or teacher of ophthalmoscopy.

**Self-Help Devices for Rehabilitation.** A co-operative service project made possible by National Foundation for Infantile Paralysis and conducted by New York University-Bellevue Medical Center, Institute of Physical Medicine and Rehabilitation. [Ninth report.] Paper. No pagination, with illustrations. Institute of Physical Medicine and Rehabilitation, 400 E. 34th St., New York 16, n.d.

This is another in a series of reports on various self-help devices. It is intended for insertion in a loose-leaf notebook. It covers a wide range of devices, including a special cuff to aid in holding a hair brush, one-handed fingernail clipper and file, toothbrush holder, work table and book rest for use by the supine patient, and many other aids to the handicapped. Either the commercial source of supply of each of the devices is given or detailed construction diagrams are provided in each case.

# QUESTIONS AND ANSWERS

## DIET FOR WEIGHT REDUCTION

To the Editor:—*A recent article appeared in* The Journal *(Thorpe, G. L.: Treating Overweight Patients, 165:1361-1365 [Nov. 16] 1957) describing a diet for obesity. In it the patient is limited to a lean meat and fat diet composed of three parts of lean meat to one part of fat. Carbohydrates were eliminated. In view of the number of articles that have appeared on cases of atherosclerosis in which high blood cholesterol levels were found, will you discuss the possible harmful effect that ingestion of so much fat would produce? Is there any scientific basis for the claim that the ingestion of a large amount of fat will burn up other fat without deleterious effect? What is the least harmful diet that one can utilize in obesity?* *M.D., Washington, D. C.*

Answer.—Many types of diet have been used successfully in the treatment of obesity, and weight loss has resulted if calorie intake was less than calorie expenditure. The high-fat diet is based on the work of Pennington, which was quoted extensively in the article cited in the question. Pennington's findings have several possible interpretations. His conclusions are based largely on hypothesis rather than proof and require substantiation before they can be accepted. Scientific evidence that ingestion of large amounts of fat will burn up other fat is indeed meagre.

In the opinion of most authorities, a diet for weight reduction should be adequate in all essential nutrients but restricted in calories. It should closely resemble a good or normal diet so that the patient may learn proper eating habits. The lean meat and fat diet does not fulfill these criteria. The high fat content of this diet may be undesirable in view of possible relationships between dietary fat intake, serum lipid levels, and the development of atherosclerosis. Such a diet does not teach optimal dietary habits. Much remains to be learned about relationships between dietary fat and atherosclerosis. It has been shown that concentrations of serum cholesterol and other lipids are increased by diets high in fat and decreased when diets low in fat or diets high in polyunsaturated fatty acids are administered. Meat fat contains only small amounts of these unsaturated fatty acids, whereas most vegetable oils contain large amounts. It has been reported, also, that serum cholesterol levels tend to decrease during periods of weight loss. This has been found in subjects eating ordinary diets containing moderate amounts of fat, but serum lipids apparently have not been studied during high-fat reducing regimens. Even if such levels are not adversely affected, there is some evidence to suggest that postprandial lipemia may have an adverse influence on the clotting mechanism. While elevated serum lipid levels have not been demonstrated to be causally related to atherosclerosis and coronary artery thrombosis, considerable evidence suggests that hyperlipidemia and hypercholesterolemia may have some role in the pathogeneses of these conditions. Until more is known, it would seem wise to avoid excessive fat intake both during and after weight reduction.

Since the relation between blood lipids and arteriosclerosis and the relation between diet and blood lipids are both matters of controversy, a qualified answer is necessary. It should be emphasized that there is no evidence to show that a high proportion of fat in a diet limited in total quantity is capable of raising the blood cholesterol concentration. Even in maintenance diets, the role of fat in controlling the concentration of cholesterol may relate more to the kind of fat than to its quantity. Indeed, it is possible to change the concentration of cholesterol by an isocaloric substitution of a saturated fat by an unsaturated one. The question as to the least harmful diet in obesity is one that provokes many schools of opinion. The fact that there is so much controversy on this point strongly suggests that there is no convincing evidence to answer it. The most reasonable diet to employ for weight reduction is one that maintains normal proportions of fat, proteins, and carbohydrates and simply limits the total quantity of the mixture.

## PREVENTING FUNGUS INFECTION IN SCHOOL GYMNASIUMS

To the Editor:—*What is a means of preventing spread of fungous infection in the school shower room or gymnasium?* *M.D., New York.*

Answer.—Recent experiments coupled with the clinical experience of physicians provide the foundation for a changed viewpoint on the causal factors of epidermophytosis. For many years preventive measures were based on the assumption that fungous disease resulted from walking on surfaces contaminated with fungi. However, attempts to

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any medical or other organization unless specifically so stated in the reply. Anonymous communications cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

V 16
1958

produce fungous disease of the feet by deliberately exposing the feet of volunteers to a solution known to contain pathogenic fungi have been unsuccessful.

Those conducting the studies to which reference has been made consider the condition of the individual's skin a most important factor in determining whether or not he will develop fungous disease following exposure. They suggest that fungi are usually present on clinically healthy skin, that preventing exposure to fungi may not be possible, and that disease results from exposure only when the individual's skin is favorable to such fungous growth. One of the conclusions is that "individual hygiene, especially the use of methods designed to maintain and increase the resistance of skin of the feet, is of the greatest importance for the prevention of fungous disease of the feet."

Complete eradication of fungi from locker and shower rooms is practically impossible because spores are long-lived and remain dormant for extended periods of time. Nevertheless, thorough scrubbing of floors is recommended. This should be done daily, using hot water and soap. Foot baths are not recommended for preventive purposes in either shower rooms or swimming pools. Their value is negligible, and they soon become dirty, insanitary, and unattractive. They are considered a hazard by some persons because they promote a false sense of security and tend to lessen emphasis on proper personal care of the feet. The most important preventive procedure is education of pupils regarding personal practices.

## EFFECTS OF ELECTRICAL SHOCKS

To the Editor:—*What are the possible long-term effects of two high-voltage electrical shocks separated by an interval of two years? The voltage was sufficient to produce second-degree burns at the site of entry and exit and to produce amnesia for a period of two to three days. Specifically, what is the nature of the long-term tension-anxiety state? Is it known whether or not the wide variety of rather bizarre physical symptoms which follow shocks are due to organic or "functional" disturbance of the central nervous system? Any comments concerning the prognosis and long-term outlook of such patients would be appreciated.*

*John W. Wilson Jr., M.D., Conway, S. C.*

Answer.—The long-term effects of high-voltage electrical shock are extremely variable as to both degree and duration. Voltage is not so much a determining factor as is strength of current, i. e. amperage (difficult to ascertain) at the point of contact and pathway through the body. Burns produced from high voltage are almost always deeper than second degree. The presence of amnesia in the case cited suggests that there was unconsciousness. The amnesia is often retrograde, and there may be associated bizarre symptoms best described as auditory or visual hallucinations. Long-term anxiety states strongly imply preexisting deep-seated emotional disturbance and/or unexpressed or expressed wishes for compensation, unless the period of unconsciousnesss was sufficiently long to cause central nervous system pathology which would be similar to that following periods of unconsciousness from other causes in which there has been circulatory or respiratory impairment with prolonged anoxia. If the current traversed the spinal cord, as from arm to arm, there could be symptoms of progressive degenerative spinal cord lesions which appear bizarre but which should present localizing neurological findings and would of course have an organic basis. The prognosis in instances where the disturbance definitely appears functional would depend upon psychiatric evaluation and response to treatment of underlying emotional disturbance. A classic discussion of electropathology, by R. H. Jaffe, appears in the *Archives of Pathology* (5:837, 1928). There is a concise excellent discussion of electrical injuries by S. E. Barrera, in "Medical Physics" (vol. 1, edited by Otto Glasser and others, Chicago, Year Book Publishers, 1944, p. 741) and a fine presentation of neuropathology and cases by Leo Alexander in *Medical Clinics of North America* (22:663, 1938) and *Journal of Industrial Hygiene and Toxicology* (20:191, 1938).

## EFFECT OF ACTINIC RAYS ON ENDOCRINE SYSTEM

To the Editor:—*A 45-year-old man developed acute myxedema. Prior to this he had been exposing himself to a sunlamp each evening for 10 to 15 minutes. He had been doing this for about three months. The lamp was placed in a position which exposed his face and neck only. A review of the literature for the past five years has failed to reveal any report of association between over-exposure to actinic rays and the development of acute hyperthyroidism or acute thyroiditis. Is there any relationship between these two, or would it be coincidental only?*

*Ramon J. Spritzler, M.D., Beverly Hills, Calif.*

Answer.—There have been many studies of the effects of visible and ultraviolet light on the endocrine systems of animals. Most of these have been concerned with changes in pigmentation in amphibia; plumage and sex cycle changes in birds; and in sexual cycles, antlers, etc. in mammals with seasonal breeding behavior. Even in birds and lower mammals, the evidence for the photoperiodic regulation of thyroid activity is not conclusive. In view of the widespread use of artificial ultraviolet light in dermatological therapy and in the home, it is probable that an effect on thyroid function would have been noted more frequently if it does, indeed, occur. On the basis of present knowledge,

it is believed that the observed sequence of events in this patient is a chance coincidence and that the sunlamp exposures had nothing to do with the thyroid disease.

## STEAM IN THE TREATMENT OF RESPIRATORY INFECTIONS

To the Editor:—*What are the indications and relative merits of cold and warm steam in the treatment of respiratory infections in infants and children?*

*M.D., Michigan.*

Answer.—The value of cold and warm steam in the treatment of respiratory infections in infants and children is dependent on the amount of water vapor in the air surrounding the patient. This amount is directly controlled by the temperature. Experienced observers feel that warm steam is more effective in the treatment of spasmodic croup (so-called old-fashioned croup) and acute laryngotracheobronchitis. However, in the presence of a high fever, the use of steam in small areas may add to the discomfort of the patient. The usual bronchitis, nasopharyngitis, and tracheitis seem to respond as well to cool steam. The type of moisture used is dependent somewhat on facilities available. The ideal, a steam room, which is usually only found in well-equipped children's hospitals, obviously has limited use in private practice. The emergency of spasmodic croup in the early hours of morning can readily be overcome by the use of a hot-water shower in the bathroom. Such steam is produced rapidly and in large amounts. For less urgent situations, the electric steam pot or generator combined with a sheet over the crib or bed is satisfactory. The mechanical electric producer of moisture is efficient and has the added advantage of operating without danger of steam burns.

## ABSORPTION OF TOPICAL STEROIDS

To the Editor:—*Would the topical steroid preparations be absorbed in sufficient quantity to cause exacerbation or activation of a gastric ulcer?*

*M.D., Illinois.*

Answer.—Each steroid compound has to be evaluated individually to find out the readiness with which it is absorbed. In the state of our present knowledge, it is difficult to generalize about the amount that would be absorbed and whether a systemic effect would be produced and whether one of the complications might be favored. Certain biochemical changes may take place in the skin and in transit, and the rate of absorption may be so slow that a general effect is not possible. In general, cortisone is relatively ineffective, whereas hydrocortisone is definitely effective and thus might produce certain systemic effects, of which the risk of the aggravation or possibly the actual production of peptic ulcer should be considered. See Sulzberger and others (*J. A. M. A.* 151:468-472 [Feb. 7] 1953) for further observations.

## EFFECT OF CREOSOTE VAPOR

To the Editor:—*A workman supervised the installation of about 50 creosote-covered pilings in a river for the building of a bridge. He claims that this caused cancer of the larynx. Could this be possible?*

*P. J. Imperato, M.D., Brooklyn, N. Y.*

Answer.—Creosote is not a chemical entity, whether from wood or coal tar. The common commercial creosote is a mixture of phenolic bodies from coal tar. This creosote is credited with cancerogenic properties, perhaps exclusively limited to the skin, although the lung has been mentioned. Lenson said, "This is particularly true of those in tar distilleries, carpenters, railroad workers, farmers, glass-furnace and steel-furnace attendants, and engineers and truckers of diesel fuel oil." So far as known, all reported cases have involved creosote in intimate contact with the skin, such as in the handling of impregnated railway crossties or in the hand painting of ship timbers. In the present instance, it is impractical to believe that the mere supervision of the installation of some 50 creosote-treated pilings could have provided significant exposure. Although odors of creosote are persistent about treated wooden objects, creosote gives off little vapor, and no substantial air contamination is to be expected. The causation of any cancer of the larynx may not be recognized as a prospect. See Lenson's "Multiple Cutaneous Carcinoma After Creosote Exposure" in the *New England Journal of Medicine* (254:520, 1956). This article contains four references, and there are others. Apart from cancer, dermatoses from creosote are far more common. In such, photosensitivity may be a factor.

## USE OF MAGGOTS IN MEDICAL PRACTICE

To the Editor:—*What species of maggots is used, if any, in the practice of medicine? What is the source of supply for this or any other species of maggots?*

*Robert L. Atkinson, M.D., Bloomington, Ill.*

Answer.—"For more than a century it was observed that fly maggots which infested the wounds of persons injured in battle frequently cleaned out the tissue debris and fragments of shattered bones and allowed rapid healing of the lesions. Baer (1931) introduced fly larvas as a surgical aid in hospitalized cases of osteomyelitis. Because of the possibility that fly larvas from a contaminated breeding source might introduce tetanus or gas bacillus into tissues where they were used, larvas were then cultured under sterile conditions for surgical use. In addition to debridement, the mag-

V 16
1958

gots ingested and frequently killed the bacteria in the lesion, and by means of a secretion, allantoin, stimulated granulation and healing. The green-bottles Phaenicia (vel. Lucilia) caesar, P. sericata (L. sericata), and the black blow fly (Phormia regina) were most commonly utilized. Stewart (1934) called attention to the fact that these larvas will attack healthy as well as decaying or moribund tissue, and will even penetrate intact human skin. Since a wide variety of antibiotics have become available in recent years for treating osteomyelitis, the use of fly larvas has generally been abandoned." See Faust and Russell, "Craig and Faust's Clinical Parasitology" (ed. 6, Philadelphia, Lea & Febiger, 1957, p. 879).

## PSORIASIS AND SURGERY

To the Editor:—*A patient has had psoriasis for about 10 years. She is to have abdominal surgery. Would an incision through the abdominal psoriasis be dangerous?*

*D. D. Mosher, M.D., Seminole, Okla.*

Answer.—Psoriasis is not a contraindication to a necessary intra-abdominal operation. The eruption may be aggravated by the stress of any major procedure, however. The incision may be made through a plaque of this disease, providing the area receives the same preoperative preparation accorded normal skin. It would be wise to remove the scales before surgery by vigorous brushing or scraping. While this may inflame the skin, it will remove mechanically many organisms that otherwise would be protected from antiseptics by the overlying scales. If there is no immediate necessity of subjecting the patient to the surgical procedure, temporary clearing of the eruption by local therapy, x-radiation, or 4-aminopteroylglutamic acid might be attempted. Cutaneous lesions may spread to the healing incision even if the surgical wound is inflicted in the grossly normal skin of a patient with psoriasis, due to the Koebner phenomenon.

## DRYNESS OF THROAT IN SINGERS

To the Editor:—*A professional singer frequently is required to sing several hours daily in large auditoriums without the assistance of amplification. He has "dryness and a sense of fatigue" in his throat and believes that his voice would be unimpaired if these sensations could be eliminated. How can he be helped?*

*M.D., California.*

Answer.—There is no doubt that singing for several hours in a large auditorium without amplification subjects the entire vocal mechanism to a severe strain. However, in some operas, such as the Wagnerian cycle, the leading characters will sing for long periods, often having to project the voice over a heavy orchestral accompaniment. These artists, through proper breathing and vocalizing, avoid straining the voice, and they prevent undue fatigue by a general physical regimen in which the entire body is kept at maximum efficiency. The individual referred to in the question must avoid unnecessary use of the voice when not singing and must obtain sufficient rest and outdoor exercise. Dryness can, to a certain extent, be alleviated by the use of a steam vaporizer with a small amount of oil of eucalyptus in the water. Simple lozenges, such as butterscotch or fruit lozenges, afford temporary relief from dryness. Medicated lozenges should be avoided. Naturally, smoking and drinking must be avoided. It is also important that stress and tension be avoided since these factors can influence the normal coordination of the extrinsic laryngeal muscles.

## FREQUENT SHAVING AND HAIR GROWTH

To the Editor:—*A nurse mentioned that she was never allowed to shave the neck of a woman ready for thyroidectomy for fear that hair would grow. Is this tradition a throwback to folklore? Are there any statistics that show whether or not shaving does affect hair growth?*

*Robert R. Reilly, M.D., Landover Hills, Md.*

Answer.—There is no truth in the belief that frequent shaving will stimulate the growth of hair. If this were true, the average young man would have been shaving his head closely for years in an attempt to retain his falling locks. This fact has been substantiated by several experimental studies. One of these investigators (Trotter, *Arch. Dermat. & Syph.* 7:93, 1923) performed numerous experiments in which she tested the effects of shaving the hair of various parts of the body in adults of both sexes. Careful measurements of the hair were made at the beginning of the study and at the end of the experiment. A comparison was made of symmetrical areas on the body, one area being shaved daily while the other was left untouched and used as a control. This type of protocol was employed over a period of several months, and the results showed that there were no differences whatsoever in the amount, length, diameter, or pigmentation of either the lanugo or terminal hairs present on either side.

## EXCESSIVE PROTEIN INTAKE

To the Editor:—*Are there any possible harmful consequences in the daily eating of one cup of cooked egg whites over a long period of time (e. g., one year)?*

*Zale A. Yanof, M.D., Toledo, Ohio.*

Answer.—So far as this consultant is aware, no harmful consequences would accrue in the daily eating of one cup of cooked egg whites for a long period of time. Of course, there are many other

sources of concentrated proteins of high biological value that would be equally of value. In particular, there is dried, defatted milk powder. The difference in biological values among egg whites, meat, fish, and chicken is very small. Proteins from eggs, meat, poultry, and fish are excellent, and over a period of time it would be essentially impossible to differentiate these proteins on the basis of nutritive value.

## HUFNAGEL VALVE

To the Editor:—*A patient with rheumatic aortic insufficiency was treated with the use of a Hufnagel valve in the thoracic descending aorta. Considerable improvement in the patient's condition was obtained, but approximately 1½ years after placement of the valve he developed an idiopathic thrombocytopenic purpura which has persisted through the succeeding year to the present time. This thrombocytopenia can be reasonably well controlled with prednisolone in a maintenance dose varying from 5 to 10 mg. daily. Has thrombocytopenia been known to occur as a late complication of the Hufnagel valve? If so, what treatment is advised?*

*D. L. England, M.D., Eugene, Ore.*

Answer.—Thrombocytopenic purpura has not been known to occur as a late complication of the Hufnagel valve to date. Theoretically, it would be expected that any disturbance of blood elements would occur in the early postoperative stage, with the possible exception that a defective valve might possibly undergo fatigue of its plastic elements and disturbance of its surface at a later date. Several of these valves have been observed in dogs under Dr. Hufnagel's direction for seven or eight years with no such complication. No specific treatment would be advised other than the usual treatment for thrombocytopenic purpura.

## SENSITIVITY TO INJECTABLE PENICILLIN

To the Editor:—*A patient who has had one attack of rheumatic fever is being given 1,200,000 units of an injectable penicillin once a month. He has had no evidence of rheumatic fever for the past six months; however, after each injection his temperature goes up to 102 F (39 C) for about 24 hours. What is the explanation for this phenomenon, and is it a common occurrence? No other patient receiving such injections has this problem.*

*C. B. Rush., M.D., Timmonsville, S. C.*

Answer.—The occurrence of fever of 24 hours duration following each injection of the particular penicillin product is doubtless a manifestation of sensitivity to the antibiotic. Such brief episodes of fever unaccompanied by other symptoms and following each injection of penicillin are unusual manifestations of hypersensitivity, but they do occur. In view of the patient's sensitivity to injected penicillin, prophylaxis of streptococcic infection may be attempted by daily oral administration of penicillin V. Should the patient also prove sensitive to this, another antibiotic will have to be used.

## HODGKIN'S DISEASE

To the Editor:—*Please give information on indications for and availability of any antiserum or its equivalent for Hodgkin's disease.*

*M.D., Maine.*

Answer.—There is no antiserum or equivalent that has proved useful in the management of Hodgkin's disease. One can therefore not comment on its indications or availability. The conventional forms of treatment of Hodgkin's disease are x-ray therapy for local disease and nitrogen mustard or one of its related compounds for the systemic manifestations of Hodgkin's disease.

## TREATMENT OF VITILIGO

To the Editor:—*A patient has a pea-sized white patch, found four months ago, on the left side of the waist. After some days this white patch was found to be increasing. Now it has increased up to 2 in. Pigmenting medicines have been used before exposure to sunlight and in the night before exposure to ultraviolet rays. The patient has had a leukodermic patch about 2 in. above the loin on the back, first noticed in 1917. There is no family history of such disease or any other disease. Please suggest dermatological help in the matter.* S. A. *Patki, M.D., Poona, India.*

Answer.—The results from treatment of vitiligo or leukoderma are generally unsatisfactory. Treatment with methoxypsoralen sometimes causes repigmentation and sometimes not; topical use of this drug usually is not recommended because of the severe bullous reaction that it is apt to produce. The patches can frequently be masked satisfactorily by painting them with a solution of potassium permanganate in concentration to match the surrounding skin.

## GUIDANCE FOR THE "OVERSEXED" CHILD

To the Editor:—*How does one dampen the natural desires and impulses of a 13-year-old girl who has just started to menstruate and is "oversexed"? She has developed very rapidly during the past year and is very conscious of her development and of the opposite sex.*

*M.D., New York.*

Answer.—It would be well to have this girl studied psychologically as well as medically. Planning for her will be dependent upon her intellectual status and her general emotional state as well as her physical condition. The conditions in her home may

V 16
1958

have bearing upon her seeming lack of self-control. One cannot lessen her drives but perhaps can direct them into more constructive channels. In view of the many considerations that may have bearing upon her conduct, it would be desirable that she be seen at a child guidance center or children's psychiatric service; general planning of a program, possibly psychotherapy (assuming adequate intelligence, which cannot be taken for granted) may be indicated. The parents will probably need guidance in her care.

## BALDNESS

To the Editor:—*A 26-year-old man, otherwise in excellent health, has been losing hair slowly but continuously for quite a few years. Even at this age, he looks a little bald. His father was quite bald too, but only when older. His mother and one older brother have thick, heavy hair. He has had occasional venereal exposures, but several serologic tests, including Kahn, are negative. The scalp is very clean. There are no signs of any fungus infection. The loss of hair is general, not the areata type. Please advise about diagnosis, further study, and treatment.*

*Chen Chek-Ling, M.D.,*
*Nakon Pathom, Thailand.*

Answer.—This man apparently has common male-pattern-type baldness, a condition that is not a completely understood and one for which there is no remedy—other than to choose one's ancestors with greater care. Apparently the baldness is not hampering his social life.

## ANESTHESIA FOR SURGERY IN DIABETIC PATIENTS

To the Editor:—*What is the preferred anesthetic management for operations on the lower abdomen and lower extremities in patients with diabetes mellitus? Is there any contraindication to spinal anesthesia in such patients who may have subclinical neuropathy? Should regional anesthesia be avoided in a diabetic patient who has symptoms of peripheral neuropathy?*

*M.D., New York.*

Answer.—The experience and competence of the anesthetist are important factors. Spinal anesthesia is desirable in diabetic patients, especially if pulmonary complications are present or anticipated, and in cardiac patients if hypotension can be averted. It is the anesthesia of choice for operations upon the lower extremities. It is wiser to avoid regional anesthesia in patients who have symptoms of peripheral neuropathy because so frequently they develop infection and tissue necrosis.

## ASYMMETRY OF DEEP REFLEXES

To the Editor:—*A 35-year-old mother of two children has an active left-patella tendon reflex, an absent right-patella tendon reflex, an active right-achilles tendon reflex, and an absent left-achilles tendon reflex. The only significant history obtainable was that the patient had been told that she had had "spinal meningitis" in infancy. What is a logical explanation for this?*

*Warren Heller, M.D., Ogdensburg, N. Y.*

Answer.—The asymmetry of the deep tendon reflexes in the lower extremities described in the question is probably of no clinical significance in the absence of any other neurological findings. Asymmetry of deep reflexes is found occasionally in normal individuals. Sometimes a seemingly absent reflex can be brought into some activity by utilizing techniques of reinforcement. It is possible however that the history of "spinal meningitis" is of significance, since this, either of itself or possibly representing really a diagnosis of nonparalytic poliomyelitis, might have produced this reflex disturbance persisting into adult life.

## HYPNOSIS FOR PAIN

To the Editor:—*A 64-year-old man had pipe-smoker's cancer of the tongue in 1930, followed by extensive x-ray and radium treatment resulting in radium burn and scar tissue; he had a second recurrence in 1934 and a cancer cell extension in the nostril in 1953. He has had no extension since then but has had almost continuous neuralgic pain in the neck, face, and occipital region but strangely has not become habituated to codeine. He has been told that hypnotic treatments would relieve the pain. Please comment.*

*Burton G. McGarry, M.D., Sarasota, Fla.*

Answer.—If the patient will allow himself to be hypnotized, there is every likelihood his perception of pain can be reduced or completely suppressed. The hypnotic sessions would have to be frequently repeated, but, unfortunately, if this patient has not previously been hypnotized, it would likely be difficult to induce a trance in him at his present age.

## CUTANEOUS IRON STAINS

To the Editor:—*A nurse gave a 14-year-old child an iron preparation subcutaneously in the right arm. She now shows a deep gray stain, 4 by 4 in. in size, on the skin of the upper outer arm. What can be done to remove an iron stain from the skin, other than excision and skin grafting or possibly tattooing?*

*J. Dudley Youman Jr., M.D., Shreveport, La.*

Answer.—As a rule, iron stains disappear from the skin in time, though it may take quite a while. The better course, in this case, rather than to use

an operative procedure, would be to keep the patch covered with a cosmetic preparation and allow time to take its effect. This consultant does not know of an effective chelating agent for such a stain.

## VITAMIN K IN FOODS

To the Editor:—*The essence of a recent article was that fresh or canned vegetables may help heart conditions, whereas frozen vegetables may contribute to frequency of attacks. Citrus fruits were not mentioned in the article. Freezing, the article said, destroys vitamin K, whereas the heat in processing does not affect it. Please give information on this matter.*

*C. L. Park Sr., M.D., Sanford, Fla.*

Answer.—There is very little information in the literature about vitamin K content in foods, especially in frozen foods. So far as this consultant is aware, there is no evidence available to show that frequency of heart attacks results from such differences in food intake. It would seem logical that a coronary patient would benefit more from a decreased prothrombin time, since blood clotting is the major concern.

## THROMBOEMBOLISM AND POSITION OF LEGS DURING SURGERY

To the Editor:—*Is there any difference in incidence of thromboembolism between vaginal surgery with legs in the lithotomy position and pelvic surgery without the lithotomy position?*

*R. S. Srigley, M.D., Altus, Okla.*

Answer.—The incidence of thromboembolism is less with vaginal surgery (with the legs in the lithotomy position) than with abdominal pelvic surgery (with the legs not in the lithotomy position). There is, however, no evidence that the position of the legs per se has anything to do with it.

## APPEARANCE OF PHYSICIANS IN PUBLIC

To the Editor:—*Although many medical societies use television and radio as well as forums and lectures to the public, there are still many physicians who believe that this is improper and unethical and, in fact, that it constitutes a form of advertising. Please explain why these once tried and tested principles are now apparently being abandoned.* *M.D., Illinois.*

Answer.—Advertising by physicians remains as unethical today as it ever was. The appearance of physicians on radio and television or in connection with public lectures and similar activities may or may not constitute a breach of medical ethics. There is no intention of abandoning ethical principles which have stood the test of time. Times have changed, however, and the interpretation of ethical principles has been modified. It is still improper and unethical for a physician to appear before the public in person or through any medium of mass communication if he does so as an individual and for the purpose of promoting his practice and procuring patients through advertising methods or by procedures which circumvent the rules of medical ethics.

Changing times have demanded that the medical profession take its place among agencies engaged in enlightening the people in matters of health. At one time, medical ethics completely prohibited the public appearance of a physician in any guise whatsoever, and this disapproval extended even to public notice of a physician or his family in connection with social events or activities unconnected with practice. A modification of medical ethics spread gradually about 30 years ago, giving physicians permission to make public appearances under the sponsorship or with the approval of their colleagues in the local medical society. A still later modification significant of rapidly changing viewpoints made it not only permissive but obligatory for a physician to respond to requests for information and interpretation, even those originating outside the profession.

The present attitude, which has few dissenters, is that the medical profession owes an obligation to the public in the area of health education and medical guidance and that this obligation requires the participation of physicians under medical auspices in situations once deemed ethically improper. Thus, a physician today may, with the approval of his local medical society, appear on television, broadcast by radio, give health lectures, write a newspaper column, and write magazine articles or books without loss of ethical status. Such physicians, however, have a special obligation toward their colleagues to perform these activities in a spirit of public service and with personal profit a secondary consideration, except in those instances where the physician engages in these activities to earn a livelihood. This, in effect, constitutes the practice of a medical specialty under the general classification of preventive medicine.

## SUBSCRIPTIONS TO THE A. M. A. JOURNAL

To the Editor:—*May anyone subscribe to* The Journal, *or is it for graduate doctors of medicine only?* *M.D., India.*

Answer.—Anyone may subscribe to The Journal. The annual subscription rates are: United States and possessions, $15.00; Canada, $17.00; and outside the United States and possessions, $21.50. A special rate of $9.00 is offered to medical students, residents, and interns.

V 1
1958